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ABSTRACT

This report describes and interprets the reading achievement rates of Title I participants over a period of six years beginning with the school year 1968-69. The primary data source consisted of 283 ESEA Title I evaluation reports for the years 1969-1974, supplemented by information from the state Title I offices. From pretest and posttest data average monthly gains in grade equivalents were calculated by year and grade. The average of the reported monthly gains are consistently near a 1.1 month gain for each month in Title I across grades and years (1971-1974). In terms of the unofficial standard of success, which is a month's gain for a month in the program, Title I can be judged a significant success. However, evidence is presented that the expected achievement pattern of the disadvantaged student changes to lowered achievement during summer periods without reading instruction. (RMN)

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Research Report

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PATTERNS IN ESEA TITLE I READING ACHIEVEMENT

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EXECUTIVE SUMMARY

This report describes and interprets the reading achievement rates of Title I participants over the last several years. The primary data source consisted of 283 SEA Title I evaluation reports for the years 1969-1974, supplemented by information from the state Title I offices. From pretest and posttest data, average monthly gains in grade equivalents were calculated by year and grade.

The averages of the reported monthly gains are consistently near 1.1 month gain for each month in Title I across grades and years (1971-1974). In terms of the unofficial standard of success, which is a month's gain for a month in the program, Title I must be judged a significant success.

However, the report raises the issue of whether the "month-for-month" criterion, or indeed any criterion that focuses solely on pretest-to-posttest gains within a single school year, provides an acceptable picture of Title I success. Evidence is presented that the expected achievement pattern of the disadvantaged student changes substantially when the summer is taken into consideration. It suggests that the disadvantaged students' higher achievement rates during Title I participation may be offset by lower achievement during periods without Title I.

As a result of the analysis we conclude that:

- Title I is a success under the currently accepted single school year criterion.
- A change to a multiyear focus for Title I evaluations is required in order to assess the goal of long-term increases in reading achievement.

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I INTRODUCTION

Congress passed the original Elementary and Secondary Education Act (ESEA) in 1965. Title I of the present ESEA directs almost \$2 billion annually to school districts to "meet the special educational needs of disadvantaged children." In the ten years that have elapsed, thousands of districts across the country have tried to improve the educational experiences of the low-income, low-achieving target group.

A unique feature of the original ESEA is that it was the first major social legislation to mandate evaluations by participating districts and states. Hence, each year, districts submit evaluations of their Title I projects to state Title I offices. The state offices summarize the district reports and submit their state evaluations to the federal Commissioner of Education. From these evaluations, as well as many others commissioned by the federal government, educators and policy makers have attempted to determine the impact of Title I.

In general, the evaluations have not provided definitive statements about the effectiveness of Title I. This is partly a result of the complexity of the program and its multitude of goals. The original legislation reflected a variety of intents, ranging from a belief that extra money to the districts was an end in itself (an end that has proved surprisingly difficult to evaluate) to a belief that the money must be translated into projects designed specifically to increase the academic achievement of disadvantaged students. The local Title I projects themselves have varied tremendously in their objectives and practices. Evaluations in the past have not succeeded in dealing with this vast complexity of goals and practices, nor should they be expected to.

Our intent was not to conduct an evaluation of Title I. Rather, our intent was to present a description of the reading achievement of Title I participants. We limited ourselves to only one goal of the program: the goal of increasing the reading achievement of disadvantaged students. We restricted our data to information gleaned from the State Educational Agency (SEA) Title I reports and from conversations with the State Title I offices. We attempted to use as much data from as many states as possible without sacrificing the quality of the data. Hence, we purposely did not develop rigorous criteria which could severely limit the amount of usable data.

In Chapter II of this report we present our analysis of Title I project gains drawn from SEA Title I evaluation reports for the six school years 1968-69 through 1973-74. The overall quality of these Title I reports has been criticized by professional evaluators. Much of the criticism has been justified, particularly when directed at reports from the earliest years of Title I. Nevertheless, we feel that the quality of some of the early reports was sufficient for our purposes and that in general the quality of the reports has improved over the last few years. Improved testing techniques and increased sample sizes have greatly enhanced the credibility of many of the recent reports. With these data we attempt to answer two questions: What are the reading achievement rates of students who have participated in Title I compensatory education programs? Are there any discernible trends in these rates? The findings are interpreted in terms of the month-for-month standard applied to Title I.

Chapter III then tackles more difficult questions: What does the month-for-month standard really mean? Is it appropriate for judging the success of Title I? The chapter evaluates this standard in two ways: first, by examining the assumptions about "expected" achievement for disadvantaged students in the absence of Title I and, second, by looking

at evidence of a Title I impact in data collected by statewide testing programs.

Chapter IV presents our general conclusions and discusses their implications for the future of Title I and evaluations of its educational impact.

II RESULTS OF STATE TITLE I PROJECT EVALUATIONS

This chapter addresses two issues: What are the reading achievement rates of students who have participated in Title I compensatory education programs? Are there any discernible trends in these rates? Our basic sources of information consisted of the SEA Title I evaluation reports from the states for the school years 1968-69 through 1973-74. A description of these reports is followed by a discussion of the procedures used to produce estimates of reading achievement rates, first at the state level, then across states. Because state data are rarely based on a census or random sample of Title I participants and data from some state reports were not usable, we defined several samples of states as a basis for estimating the degree to which the data are consistent with presumed "national" rates of reading achievement. These samples and an external set of findings are described, together with the results. Our conclusions are then presented in light of the two questions posed above.

SEA Title I Reports

The original ESEA legislation of 1965 required that each state submit an annual evaluation of its Title I activities. The SEAs request information on the Title I projects from each local educational agency (LEA) that receives Title I funds. In the early years of Title I, the state reports presented information that was often vague and not very useful to those trying to judge the impact of Title I. Weaknesses of the evaluation and reporting procedures of both LEAs and SEAs have been well documented (Glass, 1970; McLaughlin, 1974; Wargo et al., 1972). We

were able to extract very little useful information from the 1968-69 reports, our earliest data source.

In more recent years, states have begun to develop uniform evaluation procedures for the LEAs to follow. Although the quality of the SEA reports has improved substantially in the last two or three years, the reports still have many problems, which have been documented at both the national and the state level (e.g., GAO, 1975; Warder and Frier, 1973^{*}). For our purposes, the two major problems with the reports are that the samples of tested students in many states are small and not representative of the Title I participants and that tests, metrics, and times of testing vary within states and between years. In spite of these defects, these reports are the best source of national information about the reading achievement of Title I students.

This chapter is based on the data from the SEA Title I reports for six school years: 1968-69, 1969-70, 1970-71, 1971-72, 1972-73, and 1973-74. From the 50 states, our potential data sources were 300 reports (six annual reports from each of the 50 states). We were able to obtain 283 of the 300 reports: 45 for 1968-69; 41 for 1969-70; 50 for 1970-71; 49 for 1971-72; 49 for 1972-73; and 49 for 1973-74.

Since 1970-71, an SEA report has typically contained information on one or more of the following topics:

- Participation, finances, and activities of the SEA.
- Assessment of student needs and the local program objectives established on the basis of this assessment.
- Evaluation methods and the effects of the program on educational achievement.

^{*}References are listed at the end of the body of the report.

- Dissemination activities.
- Coordination with other federal programs.
- Parent involvement and advisory council.
- In-service training.

Nonpublic and summer school participation, expenditures, and achievement data are either integrated into the above sections or reported separately.

We focused on the sections of the reports describing the evaluations of the students' reading achievement. An evaluation section usually includes some (but not necessarily all) of the following information: standardized tests used, methods used to calculate and report gains, methods of evaluation other than standardized tests, pretest-to-posttest intervals, and the evaluation problems encountered by both the SEA and LEAs. Occasionally, the reports also include previous annual gains, IQ scores, and other factors related to achievement.

We now discuss the procedures followed in obtaining the desired numbers from the SEA reports we collected.

Procedures

To aggregate data within and across states we needed a common metric. Given the reporting procedures that were used, we selected as our measure the average monthly gain in grade equivalent units. Our goal was to have, for each year in our study, an average monthly gain for each grade in each state. These averages could then be weighted and averaged across states, to provide an estimate of national reading achievement rates by year and grade. We fell short of this goal in two ways. First, many states did not provide enough information for us to estimate the average monthly gain of Title I students. Second, as a result of not having these estimates for a number of states, we could not construct a nationally representative sample. To partially overcome these limitations, we chose to define several samples of states according to different criteria.

Similar results from the samples would increase our confidence in the generalizability of the results to the nation, while widely divergent results would suggest that the samples were not nationally representative.

Calculation of State Means

Ideally, the average monthly gain during Title I is derived by subtracting the pretest mean from the posttest mean and then dividing the difference by the length of time between test administrations.^{*} For example, if a third grade class had an average pretest score of 2.3 years (or 23 grade equivalent months), and an average posttest score of 3.1 years (or 31 grade equivalent months), and the time between tests was seven months (e.g., pretest in mid-October and posttest in mid-May), the average monthly gain would be 1.1.[†] If an SEA report presented the mean pretest score, the mean posttest score, and the time between pretest and posttest, then the average monthly gain could easily be calculated. However, an SEA report frequently gave only a program gain (the posttest minus the pretest). When only a program gain was presented, we requested from the state Title I office information on the amount of time between pretest and posttest. When such supplementary information was obtained, we could then convert the program gain to an average monthly gain by dividing by the amount of time between pretest and posttest.

^{*} We realize that analyses of state medians would also be highly desirable. Means and medians often present different pictures. However, too few states reported medians for us to attempt an analysis.

[†] This is the posttest minus the pretest in months ($31 - 23 = 8$) divided by the seven-month time interval ($8 \div 7 = 1.1$). Henceforth, all gains are expressed in terms of grade equivalent months.

To obtain a statewide mean for each grade, the data in an SEA report frequently had to be aggregated. Some reports presented data averaged across districts but not averaged across different tests. In these reports separate statewide means for each grade were presented for each of several standardized tests. We averaged data across tests whenever it was necessary to do so to produce a statewide mean.

Some reports averaged data across different tests but presented separate means for each district. The data from these reports were averaged across districts to get a statewide mean for each grade.

Other reports presented data averaged across grades. We omitted these data from all but one sample (see the following section for more detail).

A number of reports presented results in ranges of gain by grade. For example, a report would state how many students had a rate of gain of less than 0.7 month per month in reading achievement, and how many had a rate between 0.70 and 1.00, between 1.01 and 1.50, and greater than 1.50. From this information we calculated a statewide mean by the following procedure. First, we estimated the mean of each range by using the midpoint of the range. In all cases, zero was used as the endpoint of the lowest range, and 2.0 was used as the endpoint of the highest range. Hence, in the above example the midpoints associated with the ranges are 0.35, 0.85, 1.25, and 1.75. The estimated mean was then multiplied by the percentage or number of students in that range. An average of these weighted means was then calculated. We used this average as the statewide mean at each grade level for that state.

Several states reported both the mean for a grade and the number or percentage of students in each range. For these states we were able to verify the procedure just described by calculating a statewide mean from the ranges and comparing this mean to the reported statewide mean. The comparisons showed little or no difference between the means reported by the states and the means calculated from the ranges.

Calculation of Means Across States

After calculating average monthly gains for the states wherever possible, we were faced with the problem of how best to combine them. Because the quality of the data used in these calculations varied tremendously across states and years, there was an inevitable trade-off between the size of the sample (number of states included) and the quality of the data. We could construct samples including a large number of states and thereby include some very questionable data, or we could use a small number of states with good data and lose all hope of being nationally descriptive. Our decision was to do both. Hence, we defined four different samples.

- (1) Initial Sample
- (2) Expanded Sample
- (3) Quality Sample
- (4) Longitudinal Sample.

Additionally, we included a fifth "sample" developed by the RMC Research Corporation in their work for the U.S. Office of Education (USOE). RMC analyzed many of the SEA Title I reports, and we present their findings to provide an external comparison.

For each sample, we developed a set of criteria for including states. In all cases, we required that, for a state to be included in a given year, its report must provide reading achievement data on nationally standardized tests in a metric that would permit us to calculate the average monthly gain in grade equivalents. Additionally, the mean gain for the entire sample was calculated by weighting a state's average monthly gain by the number of Title I eligible students in that state as calculated by USOE on the basis of Census and AFDC data. In essence, this procedure weights the results of each state in proportion to the low-income characteristics of the state. We experimented with other

weighting schemes, such as weighting by the number of Title I participants tested instead of by eligible students, and found that the results were quite similar.

The four samples and their results are described below. The Initial Sample seemed to be the best compromise between size and quality. The Expanded Sample is slightly larger, and the Quality and Longitudinal Samples are more restricted. We present the Initial and Expanded Samples together, followed by the Quality and Longitudinal Samples. For each sample, we give the number of states included, the average monthly gain, and the number of states in the sample achieving at a rate greater than 1.0.

Initial and Expanded Samples

The Initial Sample includes for each year only the states that reported results by grade level and whose results were based on a sample of at least 1% of the students eligible for Title I.* Appendix A contains two tables giving detailed information on the states that were included and excluded and the types of data reported by each. The reports included in our analysis were based on the results of tests administered to over 680,000 students in 1971-72, 895,000 students in 1972-73, and almost one million students in 1973-74.

*The number of students eligible for Title I is usually far greater than the number of students who actually participate in Title I. Therefore, our standard of a 1% sample of eligible students is actually a sample ranging from 5% to 10% of the students who participated. There were two exceptions to the 1% standard. (1) Any sample of less than 50 students was excluded from our analysis. (2) There are fewer Title I participants in grades 7 through 12. To avoid eliminating these grades almost entirely, samples of over one hundred were included even if they did not meet the 1% standard.

The Expanded Sample, an expansion of our Initial Sample, was formed by including (rather than excluding, as had previously been done) the states that reported gains in reading achievement only as averages across grades. For each of these states, we had to assign the same reading achievement gain to each grade covered in the report. For example, if State Y had reported in 1971 for grades 2 through 7 an average monthly gain of 1.1 months in reading achievement for each month in the Title I program, then, for 1971, the 1.1 gain rate would be assigned to each grade, 2 through 7. This procedure allowed us to increase our initial sample by one state for 1968-69 and 1969-70, by five states for 1970-71, 1971-72, and 1972-73, and by six states for 1973-74.

Table 1 presents the results from both the Initial Sample and the Expanded Sample, to enable comparisons to be made. The first three columns are the Initial Sample and the last three the Expanded Sample. Columns I and IV give the average monthly gains in reading achievement by grade level for each of the six years. Columns II and V give the number of states on which the average monthly gain is based. Columns III and VI give the number of states that showed average monthly gains greater than month for month (1.0), the unofficial gain criterion for Title I projects.

For both samples it is important to note that the average monthly gains for the first two years are based on very few states and that the samples for successive years do not necessarily include the same states. It is also important to note that the largest sample sizes, in terms of both number of states and number of students tested, are for grades 2 through 8. Table 2 provides the total number of students tested by year and grade. The sample sizes for grades 9 through 12 are based on a small number of states, and the data of some states were based on only two or three classes. Consequently, the high school

Table 1

REPORTED AVERAGE MONTHLY GAINS BY GRADE AND YEAR
FOR THE INITIAL SAMPLE AND EXPANDED SAMPLE

Year	Initial Sample			Expanded Sample		
	I*	II*	III [‡]	IV*	V*	VI [‡]
	Average Monthly Gain	N	N 1.0	Average Monthly Gain	N	N 1.0
Grade 1						
1968-69	0.6	3	0	0.7	4	1
1969-70	0.9	3	1	0.9	4	2
1970-71	1.0	8	6	1.0	13	11
1971-72	1.0	14	7	1.0	17	9
1972-73	1.1	15	8	1.1	20	13
1973-74	1.0	17	10	1.0	22	15
Grade 2						
1968-69	1.0	8	3	1.0	9	4
1969-70	0.9	13	7	0.9	14	8
1970-71	1.0	13	8	1.0	18	13
1971-72	1.0	23	15	1.1	28	19
1972-73	1.1	25	18	1.1	30	23
1973-74	1.1	27	21	1.1	33	27
Grade 3						
1968-69	1.1	8	6	1.1	9	7
1969-70	1.0	12	10	1.0	13	11
1970-71	1.0	17	11	1.0	22	16
1971-72	1.1	24	15	1.1	29	19
1972-73	1.1	26	21	1.1	31	26
1973-74	1.1	26	20	1.1	32	26
Grade 4						
1968-69	0.9	9	4	0.9	10	5
1969-70	1.0	13	7	1.0	14	8
1970-71	1.1	15	12	1.1	20	17
1971-72	1.1	25	18	1.1	30	22
1972-73	1.0	24	17	1.0	29	22
1973-74	1.0	26	18	1.1	32	24
Grade 5						
1968-69	0.9	9	4	0.9	10	5
1969-70	1.1	15	13	1.1	16	14
1970-71	0.9	16	10	0.9	21	15
1971-72	1.0	23	19	1.1	28	23
1972-73	1.1	24	19	1.1	29	24
1973-74	1.1	24	22	1.1	30	28

* The average monthly gain in reading achievement in grade-equivalent months.

† The number of states on which the average monthly gain is based.

‡ The number of states that showed average monthly gains greater than month for month (1.0), the unofficial gain criterion for Title I projects.

Table 1 (Continued)

Year	Initial Sample			Expanded Sample		
	I [*]	II ⁺	III [‡]	IV [*]	V ⁺	VI [‡]
	Average Monthly Gain	N	N 1.0	Average Monthly Gain	N	N 1.0
Grade 6						
1968-69	1.0	10	5	1.0	11	6
1969-70	1.1	15	11	1.1	16	12
1970-71	1.0	15	9	1.0	20	14
1971-72	1.1	22	18	1.1	27	22
1972-73	1.1	24	18	1.1	29	23
1973-74	1.1	25	22	1.1	31	28
Grade 7						
1968-69	0.8	7	2	0.8	8	3
1969-70	1.0	10	7	1.0	11	7
1970-71	1.2	13	11	1.1	17	15
1971-72	1.2	19	17	1.2	24	21
1972-73	1.2	24	19	1.2	29	24
1973-74	1.2	24	20	1.2	30	26
Grade 8						
1968-69	0.9	6	3	0.9	7	4
1969-70	0.9	10	5	0.9	11	6
1970-71	0.9	11	8	1.0	15	12
1971-72	1.2	19	17	1.2	24	21
1972-73	1.2	22	18	1.2	27	23
1973-74	1.1	21	17	1.2	27	23
Grade 9						
1968-69	1.3	4	1	1.3	5	5
1969-70	1.3	7	6	1.3	7	6
1970-71	1.3	9	9	1.3	12	12
1971-72	1.3	12	9	1.3	17	12
1972-73	1.4	16	12	1.4	21	17
1973-74	1.2	17	14	1.2	21	18
Grade 10						
1968-69	0.7	3	1	0.7	3	1
1969-70	1.1	2	2	1.1	2	2
1970-71	1.3	2	1	1.3	2	1
1971-72	1.4	8	7	1.4	8	7
1972-73	1.4	14	12	1.4	15	13
1973-74	1.1	15	12	1.1	15	12
Grade 11						
1968-69	1.6	2	1	1.6	2	1
1969-70	1.1	3	2	1.1	3	2
1970-71	1.4	2	2	1.3	5	5
1971-72	1.4	7	5	1.4	11	8
1972-73	1.2	13	12	1.2	17	16
1973-74	1.2	14	10	1.2	18	14

* The average monthly gain in reading achievement in grade-equivalent months.

+ The number of states on which the average monthly gain is based.

‡ The number of states that showed average monthly gains greater than month for month (1.0), the unofficial gain criterion for Title I Projects.

Table 1 (Concluded)

Year	Initial Sample			Expanded Sample		
	I [*]	II [*]	III [‡]	IV [*]	V [*]	VI [‡]
	Average Monthly Gain	N	N _{1.0}	Gain	N	N _{1.0}
Grade 12						
1969-69		0	0		0	0
1969-70	1.4	2	2	1.4	2	2
1970-71	1.8	1	1	1.6	4	4
1971-72	1.5	6	3	1.5	10	6
1972-73	1.2	8	5	1.2	12	9
1973-74	1.2	7	5	1.2	11	9

* The average monthly gain in reading achievement in grade-equivalent months.

* The number of states on which the average monthly gain is based.

‡ The number of states that showed average monthly gains greater than month for month (1.0), the unofficial gain criterion for Title I projects.

Table 2

NUMBER OF STUDENTS TESTED IN THE INITIAL SAMPLE AND THE EXPANDED SAMPLE
BY GRADE AND YEAR

Year	Grade											
	1	2	3	4	5	6	7	8	9	10	11	
1968-69	1,527	10,965	10,607	15,929	13,459	Initial Sample						-
						10,424	21,534	8,179	3,198	1,153	424	
1969-70	5,056	34,256	33,217	40,922	47,058	33,238	11,980	14,615	5,849	1,432	3,044	307
1970-71	14,312	13,625	46,345	38,181	35,740	30,499	11,442	8,826	4,949	1,641	542	174
1971-72	35,469	93,964	117,749	100,618	88,623	78,478	37,133	27,300	14,057	6,733	2,930	1,454
1972-73	24,878	132,467	141,398	116,146	103,313	90,805	44,037	29,272	19,653	9,458	3,973	1,632
1973-74	51,136	156,171	158,014	130,745	117,366	100,562	56,090	33,197	23,420	9,506	3,963	1,382
1968-69	1,565	11,003	10,645	16,017	13,547	Expanded Sample						-
						10,512	21,590	8,235	3,254	1,153	424	
1969-70	5,332	34,532	33,493	41,077	47,213	33,393	12,046	14,681	5,849	1,432	3,044	307
1970-71	35,945	53,260	67,978	55,237	52,796	47,556	14,610	11,995	8,117	2,217	1,118	750
1971-72	48,253	106,748	130,532	112,367	100,137	89,502	41,267	31,015	16,947	7,032	3,227	1,753
1972-73	57,878	165,467	178,246	143,230	121,257	108,748	48,485	33,719	22,176	9,991	4,506	2,165
1973-74	72,747	183,965	186,083	149,265	134,837	116,594	59,945	36,056	24,899	10,136	4,531	1,921

gains tend to vary more from year to year and are inherently less stable than the gains of the earlier grades.

Looking first at the Initial Sample, two increases can be seen: the number of states meeting the inclusion criteria and, of those states, the number reporting average monthly gains exceeding 1.0. When the gains of the later years are compared with those of the first two years, an increase can also be seen. It is likely, however, that this increase is artificial, that it is merely the result of the small unrepresentative samples for the first two years.

Since the Initial Sample could not be regarded as representative of the nation, even by the last year (some of the largest states were not included), we developed the Expanded Sample, which enabled us to increase the sample size somewhat (compare Columns II and V of Table I). The results of the Expanded Sample are, surprisingly, very similar to those of the Initial Sample. In only one of 72 possible comparisons between average monthly gains do the results differ by as much as 0.2, and that comparison is based on an extremely small number of states. Eight of the possible comparisons differ by 0.1, and the remaining 63 possible comparisons show no difference. It should be noted that the Expanded Sample does include some of the largest states, e.g., New York and Ohio for 1971-72 and Michigan and Ohio for 1972-73, and that by 1971-72 the results are based on data from over 50% of the states. Since the gains from the Expanded Sample are almost identical to those from the Initial Sample, we are more confident that our results are nationally representative.

Quality and Longitudinal Samples

In contrast to the Expanded Sample, which represents an attempt to use as much of the available data as possible, the Quality and Longitudinal Samples represent an attempt to improve the quality of the data being analyzed. Therefore, these two samples are based on more stringent criteria. The more stringent criteria cause these two samples to be smaller than the Initial Sample, but provide higher quality data. If the results produced by these samples are similar to those of the larger samples, the quality of the data in the larger samples becomes a matter of less concern.

The Quality Sample includes only states whose reports were based on data from at least 40% of the participating Title I students or from a random sample of these students. A major problem with many of the SEA reports, especially those prior to 1970-71, is that the statewide means were often based on very small, nonrandom samples. By restricting the Quality Sample to states with strong data bases, we were more confident that the sample would be representative of Title I students for the states included.

The Longitudinal Sample includes only states appearing in the Initial Sample for the four years 1970-71 through 1973-74. Since we were interested in trends over time, we needed a way of determining whether the findings from the Initial and Expanded Samples were a reflection of different states being included each year.

Table 3 presents the results from the Quality and Longitudinal Samples. For comparison, the results and number of states from the Initial Sample are also presented (Columns I and II). Columns III, IV, and V give, respectively, the average monthly gain, the number of states included, and the number of states whose gains are at or above 1.0, for the

Table 3

REPORTED AVERAGE MONTHLY GAINS FOR THE INITIAL SAMPLE, QUALITY
SAMPLE, AND LONGITUDINAL SAMPLE, BY GRADE AND YEAR

Year	Initial Sample		Quality Sample			Longitudinal Sample		
	I	II	III	IV	V	VI	VII	VIII
	Average Monthly Gain	N	Average Monthly Gain	N	N 1.0	Average Monthly Gain	N	N 1.0
Grade 1								
1968-69	0.6	3	0.3	1	0			
1969-70	0.9	3	0.9	1	0			
1970-71	1.0	8	1.0	5	4	0.9	2	1
1971-72	1.0	14	1.0	8	5	0.9	2	1
1972-73	1.1	15	1.0	10	4	0.9	2	1
1973-74	1.0	17	1.1	11	7	1.0	2	1
Grade 2								
1968-69	1.0	8	0.8	1	0			
1969-70	0.9	13	0.8	3	1			
1970-71	1.0	13	1.1	5	4	1.0	11	6
1971-72	1.0	23	1.1	12	9	1.1	11	7
1972-73	1.1	25	1.1	16	11	1.1	11	8
1973-74	1.1	27	1.1	15	13	1.0	11	9
Grade 3								
1968-69	1.1	8	0.9	1	0			
1969-70	1.0	12	1.0	3	3			
1970-71	1.0	17	1.0	5	4	0.9	13	8
1971-72	1.1	24	1.2	12	9	1.1	13	8
1972-73	1.1	26	1.1	17	13	1.0	13	11
1973-74	1.1	26	1.1	15	12	1.0	13	9
Grade 4								
1968-69	0.9	9	0.7	2	0			
1969-70	1.0	13	1.0	4	2			
1970-71	1.1	15	1.0	5	4	1.0	11	8
1971-72	1.1	25	1.1	12	9	1.0	11	8
1972-73	1.0	24	1.1	15	12	1.0	11	10
1973-74	1.0	26	1.1	14	11	1.1	11	7
Grade 5								
1968-69	0.9	9	0.9	2	1			
1969-70	1.1	15	1.2	4	4			
1970-71	0.9	16	1.0	5	4	1.0	11	8
1971-72	1.0	23	1.1	11	9	1.0	11	9
1972-73	1.1	24	1.1	15	13	0.9	11	9
1973-74	1.1	24	1.1	14	13	1.0	11	10
Grade 6								
1968-69	1.0	10	0.9	2	0			
1969-70	1.1	15	1.2	4	4			
1970-71	1.0	15	1.0	5	4	1.0	11	6
1971-72	1.1	22	1.1	11	10	1.1	11	10
1972-73	1.1	24	1.1	15	11	1.0	11	9
1973-74	1.1	25	1.1	14	13	1.0	11	9

Table 3 (Concluded)

Year	Initial Sample		Quality Sample			Longitudinal Sample		
	I	II	III	IV	V	VI	VII	VIII
	Average Monthly Gain	N	Average Monthly Gain	N	N 1.0	Average Monthly Gain	N	N 1.0
Grade 7								
1968-69	0.8	7	0.8	2	1			
1969-70	1.0	10	1.0	3	2			
1970-71	1.2	13	1.3	5	5	1.2	9	7
1971-72	1.2	19	1.2	12	11	1.2	9	8
1972-73	1.2	24	1.1	16	12	1.1	9	9
1973-74	1.2	24	1.1	14	12	1.0	9	6
Grade 8								
1968-69	0.9	6	0.9	2	1			
1969-70	0.9	10	0.8	3	1			
1970-71	0.9	11	1.2	4	4	1.1	8	7
1971-72	1.2	19	1.2	12	11	1.2	8	8
1972-73	1.2	22	1.2	15	12	1.1	8	7
1973-74	1.1	21	1.2	14	12	1.1	8	5
Grade 9								
1968-69	1.3	4	1.7	1	1			
1969-70	1.3	7	1.0	2	1			
1970-71	1.3	9	1.4	4	4	1.4	4	4
1971-72	1.3	12	1.6	5	4	1.6	4	4
1972-73	1.4	16	1.3	11	8	1.5	4	4
1973-74	1.2	17	1.3	11	9	1.4	4	4
Grade 10								
1968-69	0.7	3	2.4	1	1			
1969-70	1.1	2	1.1	1	1			
1970-71	1.3	2	1.3	2	1	1.3	2	1
1971-72	1.4	8	1.4	3	2	1.4	2	1
1972-73	1.4	14	1.2	9	7	1.3	2	2
1973-74	1.1	15	1.2	11	9	1.1	2	2
Grade 11								
1968-69	1.6	2	--	0	0			
1969-70	1.1	3	1.2	1	1			
1970-71	1.4	2	1.4	2	2	1.4	2	2
1971-72	1.4	7	1.5	3	1	1.6	2	1
1972-73	1.2	13	1.3	8	7	1.4	2	2
1973-74	1.2	14	1.3	9	7	1.4	2	2
Grade 12								
1968-69	--	0	--	0	0			
1969-70	1.4	2	1.3	1	1			
1970-71	1.8	1	1.8	1	1	1.8	1	1
1971-72	1.5	6	1.7	3	2	1.9	1	1
1972-73	1.2	8	1.2	7	5	1.3	1	1
1973-74	1.2	7	1.4	5	4	1.3	1	1

Quality Sample. Columns VI, VII, and VIII give the same information for the Longitudinal Sample.

Concentrating on the four years beginning with 1970-71 and grades 2 through 8 (where the sample sizes remain tolerable), we find quite similar results between the Quality Sample and the Initial Sample, as well as between the Longitudinal Sample and the Initial Sample, in spite of the reduction in sample sizes for the Quality and Longitudinal Samples. One of the 28 possible pairs of comparisons between the Initial and Quality Samples exceeds 0.1, a rough margin of error. Only 3 of the 28 pairs of comparisons between the Initial and Longitudinal Samples exceed 0.1. All four differences are 0.2, with three of the four means higher for the Initial Sample.

Before discussing our conclusions, we present one final set of data, collected and analyzed by the RMC Research Corporation, as an additional check on the consistency of our findings.

Outside Corroboration of Results

The RMC Research Corporation has been under contract to the USOE Office of Planning, Budgeting, and Evaluation to design an evaluation and reporting system suitable for nationwide implementation at local, district, state, and federal levels. RMC performed an extensive analysis of SEA Title I evaluation reports for 1968-69 through 1973-74 and produced a sample of states deemed to be best qualified for national aggregation (Gamel et al., 1975).

RMC's primary frame of reference was the quality of the individual SEA reports. The quality was judged by whether or not unqualified conclusions about the success of Title I could be drawn. Therefore, RMC's criteria for the acceptability of SEA reports were much more stringent than ours. When data were missing from a state report, the omission

was noted, but RMC made no attempt to contact the state Title I office to acquire the missing data, since its focus was on the quality of the report rather than on the effects of Title I per se.

We present the results of the RMC analysis in Table 4. The table contains gains and average monthly gains for 1973-74 only, because the data for the previous years are based on only a few thousand students at most. With such small samples we can readily see why RMC stated that "... the data presented ... do not constitute an adequate basis for assessing the national impact of the Title I program" (Gamel et al., 1975, p. 101). However, our interest in this extremely small and select sample is to ascertain the consistency of its results with the results obtained from our much larger samples.* The gain and average monthly gain levels of the RMC results are highly consistent with our findings.

Table 4
READING-ACHIEVEMENT GAINS AND AVERAGE MONTHLY GAINS
REPORTED BY RMC RESEARCH CORPORATION

<u>Gain</u>	<u>1973-74</u>		<u>Sample Size (thousands of students)</u>
	<u>Average Monthly Gain</u>	<u>Sample Size (thousands of students)</u>	
0.8	21	1.1	20
0.8	79	1.0	69
0.8	78	1.0	69
0.9	65	1.2	57
0.8	59	1.0	54
0.8	58	1.1	50
0.8	21	1.0	19
0.9	13	1.2	10
1.0	14	1.4	14
0.9	5	1.1	5
1.0	2	1.4	2
0.9	*	1.2	2

* Less than 500 in sample. Source: Gamel et al., "State ESEA Title I Reports" (1975) Table 40, pp. 97-99.

Interpretation of the Results

Since our analyses were based on data from state reports, which were, in turn, based on reports from local school districts, it is possible that various biases exist. We cannot present an exhaustive list of the potential sources of bias,^{*} but we can alert the reader to some of the more likely candidates. Two major potential sources of bias are the reporting procedures used by the states and the generalizability (national representativeness) of our results.

Throughout this chapter the states' reporting procedures have been a serious concern as a potential source of bias. We were limited to second-hand sources--the SEA reports--which varied greatly in quality. We have stated that these reports involved many different tests, dates of testing, and forms of data presentation. We attempted to minimize this problem by defining a common measure: the average monthly gain in grade equivalents. We were not completely happy with this choice, recognizing that there are serious problems in using grade equivalents, particularly when averaging across tests given at different times and when estimating rates of growth.

Since we required reading achievement data from a nationally standardized test in an interpretable metric, we were forced to eliminate nearly half of the SEA reports. Therefore, the second potential source of bias that we have discussed is that our data were not nationally representative. Additionally, in the reports used, there was rarely

* Many of these potential sources were investigated, found not to bias our results, and are not reported. For example, the states that entered our initial sample each year have the same distribution of rates of gains as the states already included. Other sources, such as teachers depressing pretests and/or inflating posttests, are worrisome but are beyond the scope of our study.

evidence that a report was fully representative of the districts in that state (although, as noted, the number of states reporting on more than 40% of Title I participants has increased considerably in recent years). We attempted to minimize these problems by presenting four different samples, as well as an external sample for comparison. Since the results are quite similar, we are more confident that each set of results is not severely biased by missing data.

At the beginning of the chapter, we posed two questions: What are the reading achievement rates of students who have participated in Title I? Are there discernible trends in these rates? Relying on the data available from the SEA reports and from the state Title I offices, we attempted to answer these questions by looking at the average monthly gains in reading achievement from 1968-69 through 1973-74. We found that the reading achievement rates generally exceed the unofficial month-for-month standard. Focusing on the strongest data, grades 2-8 for the years 1970-71 through 1973-74, all four samples show few average monthly gains (two at the most) below 1.0 and most above 1.0. The distribution of the gains is shown below: the number of average monthly gains less than, equal to, and greater than 1.0 for each of the four samples for grades 2 through 8, 1970-71 through 1973-74.

	<u>Initial</u>	<u>Expanded</u>	<u>Quality</u>	<u>Longitudinal</u>
Less than 1.0	2	1	0	2
Equal to 1.0	7	5	3	14
Greater than 1.0	19	22	25	12

By 1971-72 the average monthly gain is at least 1.0 for every grade in all four samples of states, with only three exceptions, all in the Longitudinal Sample. The goal of an average monthly gain of 1.0 seems to have been obtained.

A few trends in the data were apparent. Each year more states produced Title I reports that contained usable data, that is, that met our criteria for inclusion in either the Initial or Quality Sample. Another trend that was apparent was that more states each year achieved an average monthly gain rate of 1.0 or greater; that is, more states each year reached the unofficial month-for-month standard. However, the rate of gain for each grade appears to have been relatively constant. Disregarding the 1968-69 and 1969-70 years because of the weak sample base, virtually no change in the rates appears across time. It might be hypothesized that, if we had data for the years prior to Title I's inception, or for the earliest years of Title I, an upward trend in achievement rates would be found. Unfortunately, the available data are not sufficient to test this hypothesis.

III INTERPRETATION OF AVERAGE MONTHLY GAIN CRITERION

The data presented in Chapter II suggest that Title I participants have reached the month-for-month standard in reading achievement. Across grades, years, and samples, the average monthly gain generally exceeds 1.0. Since this is the rough standard against which Title I has been judged in the past, it is reasonable in light of Chapter II to view Title I as successful in meeting this objective.

We do not want to detract from this apparent success. Nevertheless, it is incumbent upon us to question this standard: What does a month-for-month standard really mean, and is it appropriate for judging the success of Title I? The month-for-month standard is a shorthand statement about patterns of achievement rates. Hence, to investigate the appropriateness of the standard, we look at achievement patterns for the average and the disadvantaged student. First, we examine the assumptions about "expected" achievement for disadvantaged students. From a new set of assumptions we estimate the achievement patterns for a disadvantaged student without a Title I program. Second, we consider what the pattern of achievement might look like for the disadvantaged student participating in a Title I program.

The subject is discussed in terms of the grade equivalent (GE) scale, which is an often misunderstood and hence a misleading metric. Therefore, for the benefit of those not acquainted with GE scales we precede our discussion of achievement patterns with a brief description of the construction of a GE scale and a list of the most common problems associated with it.

Grade-Equivalent Scale

The GE scale is intended to convey the meaning of a student's test performance in terms of what is typical or expected in a given grade. This scale has a natural appeal, because its scores seem to be easy to interpret and to have direct meaning.

Unfortunately, a closer examination of the GE scale lessens its appeal. A GE scale is based on the performance of the 50th-percentile student. To establish this scale for any particular test, the test is administered to a large sample of students, presumably representative of the national population. If the test is normed at the end of the first month of school, as is the Metropolitan Achievement Test (MAT), 1970 Standardization, the GE score of 2.1 is defined as the score achieved by the 50th-percentile second-grade student, the GE score of 3.1 is defined as the score achieved by the 50th-percentile third-grade student, and likewise for each subsequent grade. The GEs for the 50th-percentile student for other times during the year are interpolated from these well-defined scores.* Since the method of interpolation varies from test to test, the achievement rate of the 50th-percentile student during the school year will vary slightly from test to test. Moreover, with the same test, this achievement rate will vary from subject to subject and from grade to grade.

* The MAT sought to verify their interpolated norms by administering their test again in April. They found that the performance of the 50th-percentile student had been overestimated, but did not revise the interpolated norms. Therefore, on the MAT, the 1.0 standard is more difficult to achieve, since it is actually greater than the average achievement rate. On other tests, the 1.0 rate was found to underestimate the achievement of the 50th-percentile student, e.g., the Stanford Achievement Test, 1973 Standardization. It is hoped that the biases balance to some extent when averaging is done across a variety of tests.

The problem of varying achievement rates is not the only problem associated with GE scale. Some other, common problems are listed below:

- (1) GE scores are frequently misinterpreted. To say that a fourth grade student whose score is 2.1 has the same ability to read as an average student at the beginning of second grade is very misleading. The fourth grader has normally been taught and tested with material that is appropriate to his grade and has been exposed to material that the entering second grader has never seen, let alone begun to learn. To equate their abilities is grossly incorrect.
- (2) The GE scale is not an equal-interval scale. The difference between 2.4 and 3.4 is not the same as the difference between 8.5 and 9.5. In some cases one additional raw-score point is translated into one additional month of achievement, while in other cases an additional point is translated into a gain of five months or more.
- (3) The GE scale does not provide a good metric for comparing performance across either tests or subject matter. Each test has its own uniquely created GE scale for each subject, and a MAT reading score does not accurately predict a CAT mathematics or reading score.
- (4) GE scores have somehow become a standard by which to judge the performance of both students and schools. However, by definition, 50% of all students at any grade will be below grade level in each subject area.
- (5) "Closing the gap" or "not falling behind" have different meanings in different metrics. "Not falling behind" in GEs means a constant GE difference between the disadvantaged student and the 50th-percentile student. However, if the disadvantaged student does maintain a constant GE difference, his percentile score will increase and thereby lessen the percentile difference between his score and that of the 50th-percentile student.

GEs are universally unpopular with psychometricians (e.g., Angoff, 1971; Cronback, 1970; Gulliksen, 1950). Even test publishers (e.g., Harcourt, Brace, Jovanovich, Inc., 1973) print cautions about their use. We would certainly have preferred to avoid GEs but were forced to use them because the SEA reports primarily presented GEs. Some states

reported percentiles, a preferable metric, but the number of such states was too small to support a meaningful analysis.

We are somewhat skeptical of any standard for success (such as month-for-month) that is expressed solely in terms of GEs. Therefore, we are less comfortable with our data and analyses, all of which are in GEs, than we would be if they were in another metric, and we imagine fairly large confidence limits around any exact numbers that we have calculated. However, a number of the issues raised in the remainder of this chapter are independent of the metric used and would not be resolved by the use of other metrics such as percentiles or standard scores.

We now turn to our discussion of patterns of achievement rates for disadvantaged students, first looking at students without Title I.

Achievement Rates of Disadvantaged Students Without Title I

In GE scales, the achievement rate of the average student is defined to be one month per month during the nine-month school year and one month over the summer. An aim of Title I has been to raise the achievement rate of disadvantaged students to this month-per-month level. The assumption has been that, if disadvantaged students achieve at this rate during the school year, they will not fall further behind the average student.* The data in Chapter II demonstrate an average monthly gain of 1.1 months for Title I students. This rate implies that Title I students are not falling further behind the average student and may, in fact, be lessening the gap. Before this optimistic conclusion can be accepted, however, it is essential to conduct a careful analysis of the expected rate of growth of the disadvantaged student who is not in Title I.

* See Item (5) on page 29.

Folk wisdom assumes that the disadvantaged student's achievement follows the same pattern as that of the average student but at a slower rate. This rate is usually estimated at approximately 70% of that of the average student.* The 70% estimate is supported by the pretest scores for the Initial Sample. Table 5 presents the pretest scores for the Initial Sample by grade by year. To estimate the annual achievement rate, we divided each pretest score by the grade level (the number of years a student had been in school, including kindergarten). These rates are fairly consistent and suggest that a student entering a Title I program has achieved on the average about 0.7 year on a GE scale, for each prior year in school.† However, this annual average masks important variations in rate of achievement during the year.

The greatest variation in achievement rate during a 12-month period is between the school-year months and the summer months. If the disadvantaged student's achievement pattern follows that of the average student, then the disadvantaged student should gain 0.7 month (70% of the average student's gain) during the summer. An extensive search of all the available empirical evidence, however, leads us to conclude that the disadvantaged student does not gain 0.7 month during the summer and therefore does not follow the pattern of the 50th-percentile student.‡ Instead, the disadvantaged student either makes no gain during the summer or loses a month. Some researchers have postulated a loss of as

*This is the figure used by USOE (GAO, 1975, p. 7).

†These pretests included some students who had previously participated in Title I. To the extent that this was the case, if Title I had been effective, these figures might overestimate the learning rate of a disadvantaged student with no prior Title I experience.

‡Most of this evidence is based on untreated disadvantaged students. A few studies include some students in compensatory programs, but not enough, we feel, to make the conclusions inapplicable to the untreated disadvantaged population.

Table 5

REPORTED PRETEST SCORES FOR THE INITIAL SAMPLE BY GRADE AND YEAR

Year	Grade											
	1	2	3	4	5	6	7	8	9	10	11	12
1968-1969												
Pretest	1.19	1.57	2.30	3.08	3.75	4.45	5.56	5.81	6.60	8.76	8.21	--
Pretest ÷ grade level	1.19	0.78	0.76	0.77	0.75	0.74	0.79	0.73	0.73	0.88	0.75	--
1969-1970												
Pretest	1.10	1.60	2.22	2.95	3.79	4.57	5.39	6.20	6.08	6.30	9.30	6.10
Pretest ÷ grade level	1.10	0.80	0.74	0.74	0.76	0.76	0.77	0.78	0.68	0.63	0.85	0.51
1970-1971												
Pretest	1.00	1.58	2.19	2.85	3.70	4.37	4.73	5.42	5.95	6.80	7.70	--
Pretest ÷ grade level	1.00	0.79	0.73	0.71	0.74	0.73	0.68	0.68	0.66	0.68	0.70	--
1971-1972												
Pretest	0.99	1.43	2.10	2.74	3.36	4.08	4.54	5.07	5.73	6.46	6.73	6.83
Pretest ÷ grade level	0.99	0.72	0.70	0.68	0.67	0.68	0.65	0.63	0.64	0.65	0.61	0.57
1972-1973												
Pretest	0.97	1.44	2.04	2.73	3.45	3.96	4.45	5.06	5.53	6.00	6.39	6.94
Pretest ÷ grade level	0.97	0.72	0.68	0.68	0.69	0.66	0.64	0.63	0.61	0.60	0.58	0.58
1973-1974												
Pretest	1.06	1.55	2.16	2.73	3.45	4.11	4.58	5.17	5.82	6.47	6.64	6.58
Pretest ÷ grade level	1.06	0.78	0.72	0.68	0.69	0.68	0.65	0.65	0.65	0.65	0.60	0.55

much as two months or more over the summer, but we found little empirical evidence to support this claim. Appendix B contains a discussion of the available evidence on the achievement gains of disadvantaged students during the summer.

If a disadvantaged student makes no gain during the summer and still gains seven months per year, then the entire seven-month gain must be made during the nine-month school year. Consequently, the achievement rate of the disadvantaged student during the school year would be 0.78 (0.8) month of gain for each month in school (the seven-month GE gain divided by nine months).

Alternatively, if the disadvantaged student actually loses a month during the summer but still has an overall gain of seven months per 12-month period, he must have made an eight-month gain during the school year. The achievement rate of the disadvantaged student during the school year would then be 0.89 (0.9) month of gain for each month in school (the eight-month GE gain divided by nine months).*

We have now shown that the expected rate of achievement for a disadvantaged student during the school year is greater than 0.7. Hence, we have shown that it is incorrect to assume that a rate of month for month for Title I students is 0.3 month per month greater than expected. Our best estimate is that the expected rate for a disadvantaged student is between 0.8 and 0.9 month. However, if 0.7 is an underestimate of annual growth, our school year rate is also an underestimate. Likewise,

* As an alternative approach to estimating the within-school-year achievement rate of disadvantaged students, we calculated the rates for the 20th-percentile student from the norming tables for each of several tests. The results of this analysis, presented in Appendix C, support our estimates of the untreated disadvantaged student's achievement rate.

if the summer loss is greater than our zero or one-month loss, the school year rate is an underestimate.

Conservatively, we postulate that an achievement rate of 1.0, that is, month for month, during the school year will not result in keeping the disadvantaged student from falling further behind. With this rate the disadvantaged student will gain one or two months less than the average student during each 12-month period. Unless the disadvantaged student increases his summer achievement rate, he must achieve at the rate of 1.1 or 1.2 months per month during the school year just to keep up.

Title I projects might be developed that would have positive effects on disadvantaged students during the summer and hence would place less of a burden on the school-year effects. To date, however, few Title I projects have specifically attempted to provide positive effects during the summer, and there is no evidence that such effects have occurred spontaneously.

Achievement Rates of Disadvantaged Students in Title I Programs

We have estimated school-year achievement rates for the disadvantaged student without Title I, by using the estimated annual achievement rate of 0.7 and estimates of a zero or one-month summer loss. We would like to carry out the same calculations for a disadvantaged student in a Title I program, but cannot, because we lack the necessary pieces of information. We need to know three rates: annual, summer, and school year. With any two of the three rates, we can estimate the third. But, for the student in Title I, we have data only on the school year rate, which we have presented in Chapter II. We do not have information that suggests the summer rate associated with Title I participation, nor do we have a 12-month rate for Title I participants. Therefore we cannot perform parallel calculations.

In the absence of these rates, we take an indirect approach to the question of the achievement pattern of Title I participants. We do this by assuming that Title I students achieve during the school year at the rates reported in Chapter II and that their summer rate is similar to that of non-Title I disadvantaged students. We then look at another data source for corroborating evidence.

Some of the states that report monthly gains greater than 1.0 also collect data annually on all students in certain grades. If the achievement pattern we have assumed above is accurate, we would expect to see the impact of Title I in such state testing data. Specifically, in the states that report state testing data by percentile, we would expect to detect an upward shift in the state testing data for low-percentile students (the students most likely to be in Title I). We tested this hypothesis by looking at data from three states (California, New York, and Michigan) and found no convincing evidence of an upward shift. Because a number of assumptions are involved in interpreting the state testing data (such as the percentage of students participating in Title I), we calculated several estimates of the magnitude of the impact we expected to see in the state testing data. These assumptions, the calculations, and the state data are presented in Appendix D.

Our finding, that the state testing data show no evidence of a Title I impact, causes us to question the meaning of the pretest-to-posttest success of Title I. Therefore, we consider below four possible explanations of the findings of the state testing data.

The first possible explanation is that the data in the state reports might be sufficiently biased to be misleading. We have suggested several potential sources of bias in Chapter II and concluded that, although some biases may exist, we are fairly confident of the summary figures.

The second possible explanation is that we might have seriously underestimated "expected" achievement rates for non-Title I disadvantaged students. In the preceding section we have suggested two conditions that could cause this: that the disadvantaged student might achieve at a rate greater than 0.7 over a 12-month period or that the student might lose more than one month over the summer. We found no data that support either condition, and hence we doubt that the non-Title I disadvantaged student achieves at a rate higher than 1.0 during the school year.

The third possible explanation lies with the state testing data. Is there reason to believe that such data would not reflect a shift attributable to Title I? There are severe limitations on the inferences that can be drawn from the state testing data. Students move in and out of Title I, and the state testing data represent all students, not just Title I participants. Therefore, it is unlikely that a large shift would be visible. (See Appendix C.) However, we conclude that, if Title I students are gaining at rates greater than 1.0, the state data should reflect some increase for the low-percentile students.

The fourth possible explanation is that the successful achievement rates may be real but short-lived. Even if students were gaining over one month per month during the school year, these gains might be associated with low achievement over the summer. Hence the gains would be visible in a pretest-to-posttest (fall-to-spring) interval but would not be carried over from year to year. There are a number of similar possibilities. For example, Title I gains might diminish over the summer and over school years in which the students return to regular classes instead of Title I.

We find the last explanation the most plausible, since lasting effects are rarely found in evaluations of educational interventions. However, we cannot justifiably dismiss the other explanations. For an

accurate description of the reading achievement of Title I students, we need longitudinal data on individuals and information on their patterns of Title I participation.*

Conclusion

The purpose of this chapter was to raise concerns about the appropriateness of the month-for-month standard and, specifically, to consider whether the achievement patterns of disadvantaged students both in and out of Title I programs are compatible with a standard of this type.

We have shown that, when the achievement rate of a non-Title I disadvantaged student over the summer is taken into consideration, a rate of month per month during the school year is not as significant as had been thought. We estimate that a disadvantaged student without Title I could be expected to gain between 0.8 and 0.9 month per month, on the basis of an estimated annual achievement rate of 0.7 and a zero or one-month summer loss.

Our estimates for the disadvantaged child in Title I are more conjectural. We took a rough look at state testing data from three states and found no evidence of an impact of Title I. From this we infer, cautiously, that Title I participants are not consistently maintaining each year an annual rate of achievement that is any higher than that expected for non-Title I disadvantaged students. This, in turn, suggests

* The Educational Policy Research Center is currently conducting such an analysis of longitudinal data on a small scale. A USOE study is scheduled to begin to collect nationally representative longitudinal Title I data in September 1976.

that the month-for-month standard, or any standard that rests solely on pretest-to-posttest achievement within a single school year, is not an adequate test of the desired impact of Title I. These ideas and their implications are expanded in Chapter IV.

IV SUMMARY AND INTERPRETATION

Each analysis in this report is flawed insofar as problems with the data and design make the results susceptible to more than one interpretation. This is hardly surprising, given that all large-scale studies of compensatory education are similarly flawed. Nevertheless, when all the separate pieces are put together (the SEA Title I evaluation data, the summer loss studies, and the state testing data), we believe that a convincing picture of what is happening in Title I programs emerges. This picture does not provide answers to all the questions; in fact, it raises as many questions as it answers. But it does indicate the current status of Title I and the direction in which Title I programs and their evaluations should progress.

The first part of the picture, shown in Chapter II, is the pretest-to-posttest gains from the SEA Title I evaluation reports. That chapter has presented average monthly gains calculated from 283 SEA reports, representing over three million students across all 12 grades. Our analyses have shown reported average monthly gains close to 1.1. The data in which we have the most confidence are for grades 2 through 8 for the school years 1970-71 through 1973-74. Across these four school years, at least 90% of the reported average monthly gains equal or exceed 1.0 for each of the four samples. Additionally, the gains have been quite stable over the years 1970-71 through 1973-74, and we have no reason to expect the pattern to change in the near future. This stability also appears to hold within states across years. The results have remained fairly stable as the states increased the number of Title I participants tested.

The next part of the picture is an attempt to understand what these reported average monthly gains imply in terms of the "success" of Title I

in increasing reading achievement. One measure of success, which has been the unofficial but widely accepted standard for a number of years, is an average monthly gain of 1.0 or greater. According to this measure, the data strongly indicate that Title I is now, on the average, a national success.

Not explicitly part of the 1.0 standard, but closely tied to it, is the assumption that the disadvantaged student without Title I achieves at the rate of 0.7 month per month. On the basis of this figure, the reported rate of 1.1 indicates that Title I students are exceeding their former rate by 0.4 month per month, or more than a 50% increase in achievement rate.

In Chapter III, however, we have presented an argument that changes the picture of how the non-Title I disadvantaged student achieves and hence modifies the magnitude of the increase that has been found. The basic argument is that the disadvantaged student's achievement pattern does not parallel that of the 50th-percentile student over the entire calendar year. The pretest data from the SEA reports support the widely accepted rate of 0.7 month for a disadvantaged student over a 12-month period. However, existing research suggests that the disadvantaged student has no gain or a one-month loss over the summer. Taking this into consideration, we have shown that the disadvantaged student is probably achieving at a rate of 0.8 or 0.9 month during the school year.

Hence, the reported Title I rate of gain of 1.1 is probably only 0.2 or 0.3 month per month higher than what would be expected, instead of the 0.4 calculated on the basis of the annual 0.7 rate. Nevertheless, an increase of 0.2 month per month over expectation is a substantial impact for a compensatory program, in spite of its falling slightly short of keeping a disadvantaged student even with the 50th-percentile student over 12 months.

The issue of achievement rates outside the pretest-to-posttest period must now be faced in the context of Title I. Specifically: Can we assume that the Title I student has the same summer rate as the non-Title I disadvantaged student? Carrying the question one step further: Can we assume that the students, in years after Title I participation, revert to their previous, non-Title I, achievement rates?

Conclusive answers to these questions require longitudinal data by student over several years of participation and nonparticipation in Title I. We did not have a source for such data, nor are we aware of the existence of one. Thus we had to look elsewhere for clues about the achievement patterns of students in Title I programs. We did have data from state testing programs in three states whose SEA reports showed Title I monthly gains of 1.0 or greater. We assumed that the only difference between the achievement patterns of disadvantaged students in and out of Title I is in the pretest-to-posttest rates, that is, that the summer rates are similar. Under this assumption, we expected to see some evidence of an impact of Title I reflected in the state testing data for low-percentile students (those most likely to be in Title I programs). We did not find such evidence. This suggested to us that something occurring outside the pretest-to-posttest period is diminishing the effects found in the reported Title I rates during the pretest-to-posttest interval.

Returning to the question of the success of Title I projects, we find that the answer is mixed. If we confine our attention to the rates from the SEA reports for the pretest-to-posttest period, the program is a success on the basis of either the unofficial 1.0 standard or our revised achievement pattern for the disadvantaged student without Title I.

However, if success is defined in terms of 12-month or multiyear achievement, the picture becomes much less clear. The state testing

data indicate the strong possibility that the increased pretest-to-posttest gains during participation in Title I are at least partially offset by lower achievement during periods of nonparticipation--either summer or school year. Moreover, when one considers the issues involved in school-year versus calendar-year or multiyear success, some current anomalies in compensatory education start to make sense. For example, the National Follow Through program, which has perhaps double the expenditures per student of Title I, plus extensive in-service training of teachers, does not seem to be achieving the magnitude of success that, on the surface, Title I is achieving. Perhaps the key to this anomaly lies in the fact that the pretest-to-posttest period for Follow Through is a full calendar year rather than a school year.

We find it very encouraging that, for the past several years, ESEA Title I must be judged a success by the month-for-month, pretest-to-posttest criterion. Nevertheless, evidence presented in this report convinces us that the ultimate success of Title I cannot be assessed in this time period. Knowledge of whether the impact of Title I persists, both over the summer and throughout years without Title I, requires longitudinal achievement data by student. Such data are needed for both periods of Title I participation and periods without Title I. Therefore, evaluations of ESEA Title I must move from a within-school-year focus to a multiyear focus. Without multiyear evaluations, we cannot conclusively assess the impact of Title I.

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Appendix A

READING ACHIEVEMENT DATA BY STATE

The original ESEA legislation of 1965 requires that each state submit an annual evaluation of its Title I activities. This appendix contains data from the SEA Title I reports for six school years: 1968-69 through 1973-74. From 50 states, our potential data sources were 300 reports (six annual reports from each of 50 states). We were able to obtain 283 of the 300 reports: 45 for 1968-69; 41 for 1969-70; 50 for 1970-71; 49 for 1971-72; 49 for 1972-73; and 49 for 1973-74.

In addition to presenting reading achievement data by state, the appendix expands the description of our procedures for calculating average monthly gains when data were provided in ranges and for testing alternative sample weights.

Sample of State Title I Reports

The states listed in Table A-1 provided usable gain data, although not necessarily in the desired form. The gain measure we use in this report is the average monthly gain made during the Title I project. This measure is derived by subtracting the pretest score from the posttest score and dividing by the length of the test interval.

Some states reported program gains, a measure derived by subtracting the pretest from the posttest score. If the test interval was also given in the report, we could convert these gains to average monthly gains. In a number of cases, however, the test interval was not reported, and we had to contact individual states for supplementary data

Table A-1

REPORTING METHODS OF SEA TITLE I EVALUATION REPORTS INCLUDED IN THIS STUDY

State	Average Monthly Gains			Program Gains			
	Statewide Year	Range of Gain	By Test	By District	Statewide Year	Range of Gain	By Test
Alabama	1968-69	1971-74*	1969-70			1972-73*	1971-72 1972-73* 1973-74
Arizona		1971-72 1972-73 1973-74					1970-71
Arkansas	1973-74						1968-69
California	1971-72* 1972-73* 1973-74	1970-71 1971-72	1969-70				
Colorado	1969-70						
Connecticut		1973-74	1969-70*	1969-70			
Delaware							1971-72*
Florida		1972-73 1973-74*	1973-74				
Hawaii						1972-73*	1972-73
Idaho		1971-72 1972-73*	1968-69 1969-70 1972-73			1973-74	1970-71
Indiana			1969-70				
Iowa	1968-69		1969-70		1971-72 1972-73 1973-74		1970-71
Kansas	1969-70 1971-72* 1972-73* 1973-74	1971-72 1972-73 1973-74	1968-69 1971-72 1973-74				1970-71
Kentucky					1972-73 1973-74		
Maine	1971-72*	1971-72 1973-74	1969-70				
Maryland		1972-73* 1973-74	1969-70* 1970-71*	1969-70 1970-71 1971-72 1972-73 1973-74			
Massachusetts	1970-71* 1971-72* 1972-73* 1973-74*	1970-71 1971-72 1972-73 1973-74	1968-69 1971-72 1972-73 1973-74	1968-69			
Michigan	1971-72				1973-74**		
Minnesota		1971-73 1972-73			1973-74		
Mississippi							1970-71
Missouri		1968-69 1969-70				1972-73*	1970-71 1971-72 1972-73 1973-74
Montana	1973-74						
Nebraska	1968-69*		1968-69 1969-70		1970-71* 1971-72* 1972-73* 1973-74*	1971-72 1972-73 1973-74	1970-71 1971-72 1972-73

Table A-1 (Continued)

State	Average Monthly Gains			By District	Program Gains			By District
	Statewide Year	Range of Gain	By Year		Statewide Year	Range of Gain	By Year	
New Jersey		1971-72						
New Mexico	1969-70				1971-72			
New York	1971-72							
North Carolina			1969-69 1969-70			1969-69 1970-71 1971-72		
North Dakota	1969-69	1971-72	1969-70		1971-72 ^a 1971-72	1971-72 1970-71		
Oklahoma					1971-72			
Pennsylvania	1969-70 1970-71 1971-72 1971-72		1971-72					
Rhode Island	1969-69 1970-71 1971-72 1971-72		1969-70		1971-72			
South Carolina	1971-72 ^a		1971-72 1971-72 1971-72				1970-71 ^a	
South Dakota	1971-72						1971-72	
Texas ^b	1971-72	1971-72 ^c 1971-72 ^d		1970-71 1971-72 1971-72				
Utah	1971-72 ^a			1971-72 1971-72	1971-72			
Vermont	1971-72		1969-70	1969-69	1971-72 ^a		1971-72 1971-72	
Virginia			1971-72	1969-70				
West Virginia							1969-69 1969-70 1970-71 1971-72 1971-72	
Wisconsin	1970-71	1971-72 ^a 1971-72 1971-72	1971-72					
Wyoming	1971-72				1971-72 ^a		1969-69 1969-70 1970-71 1971-72 1971-72	

^a Data for one year were presented in two (or more) ways (e.g., Alabama presented 1971-72 data by categories of gain and by test).

^b Data were from one district and one test.

^c Data were presented in a combination of two categories (e.g., Hawaii presented 1971-72 data in a format showing mean gains for districts by categories of gain).

^d Michigan reported by "type of component" (instruction method) (e.g., small group instruction and tutorial). We aggregated across types of components.

^e Michigan reported the 1971-72 data as average monthly gains across grades. The Department of Education's Evaluation and Research Program supplied program gains and test intervals by grade level.

^f Texas grouped its data into six of districts: over 15,000 and under 15,000 average daily attendance. For 1971-72 Texas also reported by method of instruction (combined with ranges of gain and district size).

on testing intervals in order to convert to average monthly gains and thus make the data comparable.

The states listed in Table A-2 did not provide information that was useful for this report. Some of these states did conduct standardized testing but reported the data in some metric not directly translatable to grade equivalents (e.g., decile shifts), combined data across grades (which were used in one case, the expanded analysis), or reported on only their most successful projects. However, in the great majority of cases, the state Title I evaluation simply did not provide reading achievement information based on standardized tests.

Table A-3 describes the data file that we used in our analysis. For each state, information is given on average monthly gains (by year and grade level), the sample size of the tested Title I participants, and the pretest-to-posttest interval. While the SEA Title I evaluation reports were the main source of data for this table, not all the information came from those reports. At times we had to call an SEA to pick up additional information, most often the pretest-to-posttest interval. In a few cases, SEAs indicated that some information in their reports was incorrect; when appropriate, we used the alternative information they provided.

Calculation of Average Monthly Gains from Data in Ranges

A number of states presented their results in ranges of rate of gain; for example, a state would report how many students had a rate of gain of less than 0.7 month in reading achievement for each month in the program, how many students had a rate between 0.71 and 1.00, between 1.01 and 1.50, and over 1.51. We calculated a statewide mean by the following procedure: First, we estimated the mean of each range by calculating the midpoint of the range (e.g., 0.85 is the midpoint of the range from 0.71 to 1.00). In the absence of other information in the

Table A-2

SEA TITLE I EVALUATION REPORTS EXCLUDED FROM THIS STUDY

State	Standardized Testing			Little or No Standardized Testing	
	Other than Grade Equivalent ^a	Grades Combined	Most Successful Projects	Systematic Measures ^b	Narrative or Case Studies (by county)
Alabama ^c					
Alaska				1968-69 1969-70	1970-71 1971-72 1972-73 1973-74
Arizona				1968-69 1969-70	
Arkansas	1972-73		1970-71 1971-72	1969-70	
California				1968-69	
Colorado	1968-69 1970-71 1971-72 1972-73 1973-74				
Connecticut ^d		1970-71 1971-72 1972-73			
Delaware ^e	1970-71 1972-73 1973-74			1968-69	
Florida	1968-69 1969-70 1970-71 1971-72				
Georgia ^e		1970-71	1971-72 1972-73	1968-69 1972-73 1973-74	
Hawaii ^f	1968-69 1969-70 1970-71 1971-72	1973-74			
Illinois ^g			1970-71 1973-74	1968-69 1971-72 1972-73	
Indiana ^g	1968-69			1971-72 1973-74	1970-71 ^h
Kentucky ^{g,i,j}					1970-71 ^h
Louisiana ^k	1968-69 1969-70 1971-72 1972-73 1973-74				
Maine ^l	1968-69			1972-73	
Maryland ^j					
Massachusetts				1969-70	
Michigan ^g		1970-71 1972-73		1968-69	
Minnesota ^{g,m,n}					
Mississippi	1968-69 1971-72			1969-70 1972-73 1973-74	1972-73 1973-74
Montana					1968-69 1969-70 1970-71 1971-72 1972-73

Table A-2 (Continued)

State	Standardized Testing			Little or No Standardized Testing	
	Other than Grade Equivalent ^a	Grades Combined	Most Successful Projects	Systematic Measures ^b	Narrative or Case Studies (by county)
Nevada	1968-69 1970-71			1971-72 1972-73 1973-74	
New Hampshire ^{e,j}	1970-71 1972-73			1973-74	1971-72 ^h
New Jersey ^{e,o,p}	1969-70			1970-71	
New Mexico		1970-71 1971-72 1973-74			1968-69
New York ^{e,h,j,q}		1971-72	1970-71		
North Carolina					1972-73 ^h 1973-74
Ohio		1970-71 1971-72 1972-73 1973-74		1968-69 1969-70	
Oklahoma ^d	1968-69 1970-71			1971-72	1972-73
Oregon	1968-69 1969-70 1971-72 1972-73 1973-74	1970-71		1970-71 1972-73 1973-74	
Pennsylvania ⁿ	1972-73 ^r				
South Carolina	1968-69 1969-70				
South Dakota	1970-71	1968-69 1970-71 1973-74			
Tennessee ^s				1968-69 1969-70	
Texas ^j				1969-70	
Utah	1968-69 1969-70 1970-71 ^r				
Vermont					1970-71 ^h
Virginia ^z	1968-69 1970-71 1971-72	1973-74		1970-71 1971-72	
Washington ^{e,j}		1973-74 ^r	1970-71 1972-73	1971-72	
West Virginia		1973-74 ^u			
Wisconsin				1968-69 1969-70	

^a Percentile categories (usually the shift from one decile, quartile, and so on, to another), stanines, significant differences between pretest and posttest, and the like.

^b Systematic measures: usually reported in terms of percentage or numbers of students achieving varying levels of success, e.g., "very successful," "somewhat successful," usually measured by teacher-made tests, teacher observations, and criterion-referenced tests, and sometimes combined with standardized tests.

^c 1970-71 report gave inadequate data on test interval and the time of year the children entered the program.

^d 1968-69 report included 400 separate groups, by test and by grade, with a different test interval for each. Time would not allow analysis of such data, and we therefore excluded the report.

- ^e1969-70 report not available.
- ^f1973-74 report gave grade equivalent data by grade level in categories of gain that were too large to be included here (<0 - 7 mo, 8 mo - 1.5 yr, 21.6 yr).
- ^g1972-73 report not available.
- ^hPrimarily narrative and by county, with some grade equivalent data on extremely small Ns sprinkled throughout.
- ⁱ1971-72 report not available.
- ^j1968-69 report not available.
- ^k1970-71 report presented grade equivalent data by grade level in categories of gain; however, one category spanned two grade points (1.1-2.9), so we did not include these data.
- ^l1970-71 report presented grade equivalent data by grade level. However, the pretest was administered in September 1969 and the posttest in May 1971. We did not include the 1970-71 report because of its two-year test interval.
- ^m1970-71 report gave grade equivalents by grade level in categories of gain; however the categories were too broad (less than 0, 0-1.0, 1.0 and above) to include in this study.
- ⁿ1968-69 report presented gain data, but no information on test interval was available.
- ^o1973-74 report presented data on language experience rather than reading.
- ^p1968-69 report presented data in such detail that we could not aggregate it.
- ^q1973-74 report not available.
- ^rNo Ns, or Ns too small.
- ^sThe policy in Tennessee is to return the child to the regular classroom (from the Title I class) as soon as his reading skills will allow it, so a majority of the students do not spend a full year in Title I. Pretesting and posttesting then are usually not on the same child; therefore we did not include the achievement data for the years 1970-71 through 1973-74.
- ^t1973-74 report gave grade equivalent test data from two different achievement tests, but the sample size was unavailable, so the test results could not be combined.
- ^u1973-74 report gave no test interval and no posttest data. Pretest scores and gains were given for 52 counties, by county, often with different scores for each program per county. All data were across grades.

Table A-3

ACHIEVEMENT DATA FROM INDIVIDUAL STATES
(Average Monthly Gains)

State/Rate/Pretest by Year	Sample	Test	Grade											
	Test (percent)	Interval ^a	1	2	3	4	5	6	7	8	9	10	11	12
Alabama														
Rate of Achievement														
1969	27	8							0.9					
1970	7	b		0.8			0.8			0.9			0.6	
1971			e	e	e	e	e	e	e					
1972	88	8	1.1	1.2	1.1	1.1	1.1	1.1	1.3	1.3				
1973	52	8	1.1	1.1	1.0	1.2	1.2	1.2	1.4	1.3				
1974	65	8	1.4	1.3	1.1	1.3	1.2	1.4	1.2					
Pretests														
1969									6.2					
1970			1.8				4.3			6.8			10.0	
1971			1.4	2.0	2.8	3.5	4.2							
1972			1.2	2.0	2.7	3.4	4.2	4.4	5.0					
1973			1.2	1.8	2.4	3.0	3.7	4.1	4.8					
1974			1.1	1.8	2.4	3.0	3.7	4.3	4.8					
Alaska ^d														
Arizona														
Rate of achievement														
1969														
1970														
1971	8	na	1.1	0.8	0.9	1.1	1.1	1.6	1.1	1.8	1.1	e	e	e
1972	32	na	0.8	0.9	0.9	0.9	1.0	1.0	1.0	1.1	1.0	1.0	1.1	0.9
1973	67	na	1.1	0.9	1.0	1.0	1.0	0.9	1.0	1.0	1.0	1.0	1.1	0.9
1974	86	na		1.0	0.8	1.0	1.0	1.1	1.1	1.2	1.2	1.2	1.1	1.3
Pretests														
1969														
1970														
1971			0.8	2.0	2.5	2.6	3.7	3.8	3.9	5.0	6.9	e	e	e
1972														
1973														
1974														
Arkansas														
Rate of achievement														
1969	1	f		e	0.4	0.6	0.4	0.8	e	e				
1970														
1971														
1972	16													
1973														
1974	13	8	0.6	0.9	0.9	1.0	1.0	0.9	0.8	1.0	1.1	0.6	0.9	e
Pretests														
1969				1.6	2.3	3.2	3.8	4.0	3.3	2.9				
1970														
1971														
1972														
1973														
1974			1.2	1.3	1.9	2.5	3.0	3.6	4.0	4.2	5.9	6.7	8.1	e
California														
Rate of achievement														
1969														
1970	45	na	0.9	0.8	1.0	1.1	1.1	1.2	1.0	0.8	0.9	1.1	1.2	1.3
1971	51	na	1.0	1.1	1.0	1.1	1.0	1.0	1.4	1.2	1.5	1.4	1.4	1.8
1972	63	7	1.0	1.1	1.3	1.1	1.1	1.1	1.2	1.3	1.7	1.6	1.7	1.9
1973	61	7	1.0	1.1	1.1	1.1	1.0	1.1	1.1	1.3	1.6	1.3	1.4	1.3
1974	52	7	1.1	1.0	1.0	1.3	1.0	1.1	1.0	1.3	1.4	1.1	1.3	1.3

Table A-3 (Continued)

State/Rate/Pretest by Year	Sample Test (percent)	Test Interval	1	2	3	4	5	6	7	8	9	10	11	12
California (continued)														
Pretests														
1969														
1970														
1971														
1972			1.0	1.5	2.1	2.8	3.4	4.0	4.4	5.0	5.6	6.1	6.7	6.7
1973			1.0	1.5	2.1	2.8	3.5	4.1	4.5	5.0	5.7	6.2	6.4	7.0
1974			1.0	1.7	2.3	2.8	3.6	4.2	4.6	5.1	5.9	6.4	6.3	6.5
Colorado														
Rate of achievement														
1969														
1970	17	8				1.0								
1971														
1972														
1973														
1974														
Connecticut														
Rate of achievement														
1969														
1970	18	g	1.0	0.9	1.0	1.0	1.0	1.2	1.2	1.5	2.2	1.3	e	e
1971	na	na						Statewide mean 1.1						
1972	na	na						Statewide mean 1.0						
1973	na	na						Statewide mean 1.2						
1974	6	8		0.9	1.0	1.1	1.5	1.1	1.4	e				
Pretests														
1969														
1970														
1971														
1972														
1973														
1974				1.7	2.3	3.0	4.1	4.5	4.7	e				
Delaware														
Rate of achievement														
1969														
1970														
1971														
1972	na	8		0.8	0.7	0.4								
1973														
1974														
Pretests														
1969														
1970														
1971														
1972				1.5	1.8	2.5								
1973														
1974														
Florida														
Rate of achievement														
1969														
1970														
1971														
1972														
1973	52	na	0.9	0.9	0.9	0.9	0.9	0.8	0.9	0.8	0.6	0.9	0.9	e
1974	76		0.6	0.8	0.9	0.9	1.1	1.1	1.3	1.2	1.4	0.8	0.8	e
Georgia														
Rate of achievement														
1969														
1970														
1971														
1972														
1973	1	12		e	e	e	e	e	e	e				
1974														

Table A-3 (Continued)

State/Rate/Pretest by Year	Sample Test (percent)	Test Interval	1	2	3	4	5	6	7	8	9	10	11	12
Georgia (continued)														
Pretests														
1969														
1970														
1971														
1972														
1973				1.3	2.3	3.1	3.6	4.7	5.4	5.8				
1974														
Hawaii														
Rate of achievement														
1969														
1970														
1971														
1972														
1973	51%	9	0.8	0.9	0.9	0.9	1.0	0.9	1.0	0.9	0.9	1.0	1.0	1.1
1974	54	8					Statewide mean 1.2 ^h							
Idaho														
Rate of achievement														
1969														
1970	1	1			0.7	0.9	1.0	1.3	e					
1971	1	1			e	e	e	e	e					
1972	2	7		e	1.2	1.4	1.3	e	e					
1973	27	na	1.0	1.2	1.5	1.2	1.4	1.4	1.3	1.5	1.5	1.2	1.4	
1974	15	8	1.0	1.3	1.2	0.9	1.0	1.0	1.2	0.9				
Pretests														
1969														
1970				2.9	3.4	4.7	4.8	7.0						
1971				e	e	e	e	e						
1972														
1973														
1974														
Illinois ^k														
Indiana														
Rate of achievement														
1969														
1970	5	1		1.2	0.9	0.8	1.0	0.9	e	e				
1971														
1972														
1973														
1974														
Pretests														
1969														
1970				1.6	2.7	3.2	4.0	5.0	e	e				
1971														
1972														
1973														
1974														
Iowa														
Rate of achievement														
1969	49	12				0.7	0.9	0.9	0.7	0.8				
1970	54	12				0.7	1.2	1.2	0.9	0.7				
1971	100	12	1.1	1.1	1.2	1.1	1.3	1.5	1.0	1.2	1.4	e	e	e
1972	100	12		1.0	0.9	1.1	1.0	1.0	1.1	1.1				
1973	100	12		0.9	1.0	1.0	1.1	1.1	1.2	1.1				
1974	56	12		0.9	0.9	0.9	0.9	0.9	1.1	1.0				
Pretests														
1969						2.5	3.2	4.1	4.9	5.5				
1970						2.5	3.2	4.0	5.3	5.7				
1971														
1972														
1973														
1974														

Table A-3 (Continued)

State/Rate/Pretest by Year	Sample Test (percent)	Test Interval	Grade											
			1	2	3	4	5	6	7	8	9	10	11	12
Kansas														
Rate of achievement														
1969	17%	8		0.9	1.2	1.1	0.6	1.1	0.9	1.4	1.6			
1970	23	8		1.1	1.0	1.1	1.1	1.1	1.4	1.4				
1971	31	8		1.1	1.0	1.0	1.1	1.3	1.3	1.3	1.1			
1972	58	8		1.1	1.0	1.1	1.1	1.2	1.2	1.3				
1973	51	8		1.3	1.3	1.3	1.3	1.3	1.2	1.5				
1974	94		1.0	1.0	1.0	1.0	1.1	1.0	1.1	1.0	0.9	1.3	1.0	e
Pretests														
1969				1.0	1.5	2.1	3.1	3.0	4.6	4.4	4.1			
1970				1.5	2.2	3.0	3.2	4.7	5.5	6.4				
1971				1.7	2.4	3.1	3.8	4.6	5.1	5.4	5.5			
1972				1.7	2.4	3.0	3.7	4.3	5.3	5.7				
1973														
1974														
Kentucky														
Rate of achievement														
1969														
1970														
1971	5													
1972														
1973	80	n	1.3	1.2	1.2	1.1	1.2	1.2	1.1	1.3	1.3	1.1	1.2	1.3
1974	77	o	1.3	1.1	1.1	1.1	1.2	1.2	1.2	1.3	1.6	1.2	1.6	1.6
Pretests														
1969														
1970														
1971														
1972														
1973			0.6	1.3	2.0	2.6	3.2	3.8	4.3	4.9	6.0	6.4	6.7	7.3
1974														
Louisiana														
Rate of achievement														
1969														
1970														
1971	42	na												
1972	35	na												
1973	72	na												
1974	69													
Data reported by percentile-band movement														
Maine														
Rate of achievement														
1969														
1970	2	8		1.1	1.3	1.0	1.0	1.0	0.9	0.6				
1971														
1972	22	8	1.0	1.0	1.1	1.0	1.1	0.9						
1973														
1974	6			1.1		1.0		1.1						
Pretests														
1969														
1970				1.3	1.7	2.6	4.2	5.4	5.9	6.4				
1971														
1972			1.2	1.6	2.3	3.1	4.0	4.5						
1973														
1974														
Maryland														
Rate of achievement														
1969														
1970	50	7		0.7	1.1	0.7	1.5	1.4						
1971	25	p	1.4	0.7	0.8									
1972	70	p		0.8	0.8	0.9			1.1	0.7				
1973	85	p		0.9	0.9				0.9					
1974	26	12		0.7	0.6									

Table A-3 (Continued)

State/Rate/Pretest by Year	Sample	Test	Grade											
	Test (percent)	Interval	1	2	3	4	5	6	7	8	9	10	11	12
Maryland (continued)														
Pretests														
1969														
1970				1.6	1.9	2.8	3.2	4.2						
1971														
1972				1.5	1.9	2.2			4.0	4.8				
1973				1.5	1.8				4.2					
1974				1.5	1.9									
Massachusetts														
Rate of achievement														
1969	8%	q	e	1.2	1.2	1.0	1.1	1.4	e	e	e			
1970														
1971	4	r	e	1.0	1.4	1.1	1.3	1.4						
1972	16	s	0.8	1.0	0.9	1.0	1.0	1.0	e	e				
1973	34	t	1.0	1.2	1.0	1.0	0.7	1.1	e	e				
1974	24	u	1.0	1.1	1.1	0.9	1.0	1.2	2.0	e				
Pretests														
1969			e	1.5	2.7	3.5	4.2	4.9	e	e	e			
1970														
1971			1.4	1.7	2.4	3.1	3.7	4.5						
1972			1.4	1.8	2.5	3.2	3.6	4.3	e	e				
1973			1.1	1.9	2.5	3.1	3.9	4.4	e	e				
1974			1.1	1.7	2.4	2.9	3.5	4.2	e	e	e			
Michigan														
Rate of achievement														
1969														
1970														
1971	80% of LEAs	8				1.0								
1972	80% of LEAs	na	1.4	1.2	1.3	1.3	1.3	1.4	1.5	1.5	1.5	1.5	1.5	1.5
1973	80% of LEAs	na	--1.3--		--1.2--		--1.2--		--1.3--			--1.5--		
1974	84% of LEAs	v		1.3	1.3	1.2	1.3	1.3						
Pretests														
1970														
1971														
1972														
1973														
1974				1.6	2.2	2.8	3.5	4.0						
Minnesota														
Rate of achievement														
1969														
1970														
1971	40% SRS ^W	12												
1972	100	12			1.0	1.0	1.0	1.0	1.0	1.0	0.4	e	e	e
1973	100	12			1.0	1.0	1.0	1.0	0.9	1.0	0.9	0.9	1.0	0.7
1974	89	12	1.1	1.1	1.2	1.1	1.1	1.0	1.2	1.1	1.1	1.0	1.0	e
Mississippi														
Rate of achievement														
1969														
1970														
1971	3	x		1.1	1.1	1.5	0.6	1.0	1.3	0.3	1.1	e	e	e
1972														
1973														
1974														
Pretests														
1969														
1970														
1971				1.8	2.2	2.5	3.8	4.1	4.7	5.4	5.5	e	e	
1972														
1973														
1974														

Table A-3 (Continued)

State/Rate/Pretest by Year	Sample Test (percent)	Test Interval	Grade											
			1	2	3	4	5	6	7	8	9	10	11	12
Missouri														
Rate of achievement														
1969	127	12	0.6	0.8	1.1	0.7	0.8	0.9	0.8	0.7	1.1	0.4	0.6	e
1970	22	12	0.6	0.7	1.0	0.8	0.9	0.7	0.9	0.7	1.0	e	e	
1971	75	12	0.6	0.9	0.8	0.8	0.8	0.8	1.0	1.0	1.0	0.9	1.5	e
1972	74	12	0.7	0.9	1.0	1.0	1.0	1.0	1.0	1.0	1.1	0.7	0.9	0.9
1973	48	12	0.6	1.1	1.3	1.2	1.2	1.2	1.3	1.1	1.3	1.4	1.2	e
1974	74	12	0.8	1.1	1.3	0.9	1.1	1.1	0.9	0.9	1.0	1.3	1.8	e
Pretests														
1969			0.9	1.6	2.2	3.3	3.7	4.4	5.2	6.2	6.4	7.3	8.9	e
1970			1.1	1.8	2.3	3.2	3.9	4.9	5.3	5.7	5.5	e	e	
1971			0.9	1.6	2.1	2.9	3.8	4.5	5.4	6.3	6.3	6.8	7.7	8.7
1972			1.0	1.4	2.1	2.8	3.4	4.3	4.8	5.4	6.3	5.8	7.4	8.4
1973			1.1	1.8	2.4	3.0	4.1	4.6	4.9	5.4	5.7	5.7	6.4	e
1974			0.8	1.4	2.0	2.6	3.3	4.1	4.6	5.1	5.6	5.9	7.1	e
Montana														
Rate of achievement														
1969														
1970														
1971														
1972														
1973														
1974		8	1.0	1.1	1.1	1.2	1.1	1.4	1.1	1.0	1.4	1.0	1.1	1.6
Pretests														
1969														
1970														
1971														
1972														
1973														
1974			0.9	1.5	2.2	2.8	3.4	4.1	5.2	5.7	6.6	7.5	7.7	9.2
Nebraska														
Rate of achievement														
1969														
1970	4	na			1.1	1.0	1.2	1.1						
1971	9	9			1.1	1.0	1.3	0.9						
1972	29	9		1.1	1.1	1.0	1.2	1.2	1.3	1.1	1.0			
1973	70	9	0.7	1.1	1.1	1.0	1.1	1.1	1.2	1.1	1.1	1.0	1.0	1.0
1974	63	9	0.8	1.1	1.0	1.0	1.1	1.1	1.2	1.1	0.9	0.9	0.9	0.9
Nevada														
Rate of achievement														
1969														
1970														
1971														
1972														
1973	100													
1974														
New Hampshire														
Rate of achievement														
1969														
1970														
1971	72													
1972	4													
1973	62													
1974														
New Jersey														
Rate of achievement														
1969														
1970														
1971														
1972	36		0.8	0.9	1.0	0.9	1.0	1.0	1.0	1.0	1.1	1.3	1.3	e
1973														
1974														

Table A-3 (Continued)

State/Rate/Pretest by Year	Sample	Test	Grade												
	Test (percent)	Interval	1	2	3	4	5	6	7	8	9	10	11	12	
New Mexico															
Rate of achievement															
1969															
1970		9	1.0	1.0	0.9	1.0	0.8	0.9	1.0	1.0	1.3	0.4	1.4	1.3	
1971															
1972															
1973															
1974		8	1.0	1.1	1.1	1.4	1.2	1.1	-----2.9-----						
New York															
Rate of achievement															
1969															
1970															
1971															
1972	12%		-----1.3-----						-----1.7-----						
1973	23		1.3	1.0	1.1	0.8	1.4	1.4	1.9	1.4	1.9	2.0	1.2	e	
1974															
North Carolina															
Rate of achievement															
1969	12	8	0.7	0.9	1.1	0.9	0.9	0.9	0.7	0.9	1.3	0.7	2.0	e	
1970	4	8	e	0.9	1.1	0.9	1.1	0.9	0.8	1.1	2.0	e			
1971	4	7	e	1.1	1.1	1.0	0.6	0.6	1.0	0.7	1.2	e	e	e	
1972	16	7	0.8	0.9	0.9	1.1	1.0	0.9	0.9	1.0	0.9				
1973															
1974															
Pretests															
1969			1.3	1.7	2.4	3.2	3.9	4.8	5.7	5.9	7.1	9.5	7.9	e	
1970			0.5	1.6	2.2	3.0	3.7	4.6	5.6	6.3	6.3	e			
1971			0.7	1.4	2.3	3.1	3.9	4.7	4.7	5.5	6.1	e	e	e	
1972			0.7	1.6	2.1	2.6	3.3	4.0	4.7	5.1	5.8				
1973															
1974															
North Dakota															
Rate of achievement															
1969	2	y	e	1.1	1.1	1.1	1.1	1.1	1.2	1.0	e				
1970	2	z	e	1.6	1.5	1.0	1.0	0.9	1.6	e					
1971	5	na	0.5	0.8	0.8	0.7	0.9	0.7	0.9	e					
1972	Approx. 50	na	0.8	0.9	0.9	0.8	0.8	0.8	0.8	1.0	e	e	e	e	
1973	53	na	0.5	1.0	1.2	1.0	1.0	1.0	1.0	1.1	1.1	e	e	e	
1974	48	aa		1.4	1.4	1.2	1.2	1.4	1.1	1.4	1.2	1.3			
Pretests															
1969			1.0	1.7	2.4	3.2	4.1	4.8	5.4	6.2	e				
1970			0.8	1.7	2.4	3.1	4.0	4.8	5.3	e					
1971			1.5	1.9	2.5	3.2	4.0	4.9	5.3	e					
1972															
1973			1.3	1.6	2.5	3.4	4.0	4.7	5.3	6.1	5.5	e	e	e	
1974				1.5	2.2	3.0	3.7	4.3	4.8	5.4	5.0	6.5			
Ohio															
Rate of achievement															
1969															
1970															
1971	99									Statewide mean 1.1					
1972	100									Statewide mean 1.1					
1973	100									Statewide mean 1.1					
1974	100									Statewide mean 1.1					
Oklahoma															
Rate of achievement															
1969															
1970															
1971															
1972															
1973															
1974	34	12	0.9	0.9	1.0	0.9	0.9	1.0	1.2	1.2	1.1	1.3	1.3	e	

Table A-3 (Continued)

State/Rate/Pretest by Year	Sample	Test	Grade											
	Test (percent)	Interval	1	2	3	4	5	6	7	8	9	10	11	12
Oregon														
Rate of achievement														
1969														
1970														
1971	38%													
1972														
1973														
1974														
Statewide mean 1.1														
Pennsylvania														
Rate of achievement														
1969														
1970														
1971	2	na			0.8		1.0							
1972	1	na			0.9		0.8							
1973	1	na		e	e	e	e	e	e	e	e			
1974	30	bb	0.7	1.0	1.0	1.0	1.1	1.1	1.4	1.2	1.5	1.4		e
Pretests														
1969														
1970														
1971														
1972														
1973														
1974			1.2	1.6	2.2	2.9	3.5	4.3	4.9	5.8	6.3	6.7		
Rhode Island														
Rate of achievement														
1969	52	8	0.3	0.8	0.9	0.9	1.1	0.9	1.3	1.2	1.7	2.4	e	e
1970	52	cc	e	1.1	1.4	0.3	0.6	1.6	2.2	2.4	3.5	e		
1971	41	na	1.7	1.1	1.4	1.3	1.2	1.2	2.6	2.8	2.6			
1972	52	na	1.1	1.3	1.5	1.2	0.9	1.2	1.5	1.6	2.4	e	e	e
1973	45	na	e	1.4	1.5	1.3	1.4	1.7	2.0	1.9	2.3	e	e	e
1974	62	8	0.9	1.4	1.5	1.5	1.5	1.5	1.4	1.8	2.5	2.8	e	e
Pretests														
1969			1.4	1.6	2.2	2.8	3.9	4.6	5.3	6.2	6.9	7.8	e	e
1970			e	1.6	2.0	2.6	3.3	5.0	4.4	5.4	6.1	e		
1971			1.4	1.4	2.0	2.6	3.3	4.1	4.5	5.0	6.6			
1972			1.4	1.5	2.0	2.7	3.3	3.9	4.3	5.2	5.0	e	e	e
1973			e	1.5	1.9	2.6	3.4	4.2	4.6	4.9	5.9	5.2	e	e
1974			1.2	1.4	1.9	2.6	3.3	4.3	4.7	5.2	5.6	5.2	e	e
South Carolina														
Rate of achievement														
1969														
1970														
1971	0.2	3			e	e	e		e		e			
1972				0.8	0.8	0.7	0.9	0.6	1.0	0.9	0.6	1.2	1.0	0.7
1973				0.8	1.0	0.9	1.4	1.1	0.8	1.0	0.5	1.7	1.0	0.7
1974	11	dd				0.6			1.0		0.6		1.0	
Pretests														
1969														
1970														
1971					e	e	e		e		e			
1972														
1973														
1974						2.4			3.9		4.7		6.4	
South Dakota														
Rate of achievement														
1969	3	8	-----1.8-----				-----1.1-----			-----1.0-----				
1970	8	8	-----1.3-----				-----1.2-----			-----1.0-----				
1971	36	na	1.1	1.1	1.1	1.1	1.1	1.1	1.0	1.0				
1972	53	8	1.0	1.4	1.1	1.1	1.3	1.1	1.4	1.0	0.8			
1973	84	na	0.9	1.0	0.9	0.9	0.9	0.9	0.9	0.9	e	e		
1974	68	12	-----1.0-----				-----1.0-----			-----1.0-----				

Table A-3 (Continued)

State/Rate/Pretest by Year	Sample	Test	Grade											
	Test (percent)	Interval	1	2	3	4	5	6	7	8	9	10	11	12
South Dakota (continued)														
Pretests														
1969														
1970														
1971														
1972			1.0	1.7	2.5	3.2	3.9	4.7	5.4	6.4	e			
1973														
1974														
Tennessee ^{ee}														
Texas														
Rate of achievement														
1969														
1970														
1971	16%	na		0.8	0.6	0.9	0.8	0.8	0.8	0.7				
1972	9	na		1.1	1.0	1.0	1.0	1.0	1.2	1.0	1.1	1.4	e	e
1973	15	na		1.0	0.7	0.9	0.7	0.8	1.0	0.8	1.2	1.2	1.3	e
1974	45	na		1.0	0.9	0.9	1.0	0.8	0.9	0.8	1.0	1.0	0.8	0.7
Pretests														
1969														
1970														
1971														
1972				1.3	1.9	2.6	3.2	3.8	4.6	5.0	5.0	7.1	e	e
1973														
1974														
Utah														
Rate of achievement														
1969														
1970														
1971		e												
1972	97	7	1.0	1.4	1.3	1.0	1.1	1.1	1.4	1.5	1.2	1.5	0.8	1.0
1973	Approx. 95	na	1.2	1.3	1.2	1.0	1.1	1.1	1.3	1.7	1.6	1.7	1.7	2.0
1974	62	9	1.8	1.3	1.3	1.4	1.2	1.3	1.6	1.4	1.8	2.2	2.1	2.1
Vermont														
Rate of achievement														
1969	1	8		0.9		e		1.0		e				
1970		9		e		e		1.1		e				
1971														
1972	15	7		1.2		1.1		1.6		e				
1973	40	na	1.8	1.1	1.2	1.0	1.3	1.5	1.0	e				
1974	29	7	e	1.1	1.3	1.3	1.3	1.3	1.6	1.7	e			e
Pretests														
1969				1.5		3.1		4.9		6.8				
1970				1.2		3.2		3.2		4.5				
1971														
1972														
1973														
1974			e	1.5	2.2	2.6	3.0	3.8	4.3	5.6	e			
Virginia														
Rate of achievement														
1969														
1970	0.1	na	e	1.1	e	e	1.3	1.3	e	e	1.1	e		
1971	4	na												
1972	6	na												
1973	43	na		0.9	1.0	1.0	1.0	1.0	1.0	1.1				
1974	45	8												
Statewide mean 1.2														
Washington ^{ff}														

Table A-1 (Continued)

State/Rate/Pretest by Year	Sample	Test	Test	Grade												
		(percent)	Interval	1	2	3	4	5	6	7	8	9	10	11	12	
West Virginia																
Rate of achievement																
1969	2%	8		1.2	1.0	1.6	1.2	1.1	e	e	e	e	e	e		
1970	2	8 ^a	e	1.6	1.1	1.2	1.3	1.0	1.2	1.1	1.4	e	e	e		
1971	1	na		e	1.0	1.1	0.8	1.0	1.1	1.0	1.5	e	e	e		
1972	1	na	e	1.2	1.3	1.3	1.4	1.1	e	e	e	e	e	e		
1973	14	na		1.6	1.1	0.9	0.7	0.8	1.1	1.0		e				
1974				1.0						1.0						
Pretests																
1969				1.5	1.0	2.7	3.4	4.3	e	e	e	e	e	e		
1970			e	1.1	2.1	2.9	3.7	4.2	5.2	6.0	6.0	e	e	e		
1971				e	1.8	2.5	3.2	4.0	4.1	4.4	5.6	e	e	e		
1972			1.1	0.7	1.7	2.3	2.9	3.7	e	e	e	e	e	e		
1973				0.8	1.7	2.6	3.6	4.3	5.6	6.6		e				
1974																
Wisconsin																
Rate of achievement																
1969																
1970																
1971	10% random	na	1.1	1.0	1.2	1.1	1.2	1.0	1.2	e	e	e	e	e		
1972	25% SRSW	na	1.1	1.1	1.0	1.2	1.2	1.3	1.8	1.5	e	e	e	e		
1973	25% SRS	na	e	1.4	1.5	e	e	e	e	e	e	e	e	e		
1974	10% SRS		1.4	1.4	1.4	e	e	e	e	e	e	e	e	e		
Wyoming																
Rate of achievement																
1969	7	9	e	e	1.2	0.9	1.0	1.1	1.2	0.8						
1970	34	9			0.9	1.0	0.9	0.9	1.0	1.1						
1971	12	7		1.1	1.1	1.1	0.8	1.2	1.1							
1972	51	7	0.4	1.2	1.2	0.8	1.2	1.2	1.5	1.2	e	e	e	e		
1973	57	7	0.8	1.1	1.2	1.2	1.2	1.2	1.7	1.1	1.6	0.1	0.7			
1974	71		1.4	1.2	1.3	1.4	1.5	1.6	0.8	0.8	e	e	e	e		
Pretests																
1969																
1970																
1971																
1972				1.2	1.3	1.5	1.2	1.3	4.5	5.4	6.4	e	e	e	e	
1973				1.2	1.3	1.5	1.0	3.8	4.3	5.2	6.1	e	e	e		
1974																

Note: For years 1969-1974, sample size is the number of students tested as a percentage of Title I reading participants. When reading participation data were unavailable, Title I participation was substituted.

For 1969 and 1970, sample size is the number of students tested as a percentage of Title I reading participants for the following states: 1969, Arkansas, Kansas, Iowa; 1970, Alabama, Iowa, Kansas, Pennsylvania, Virginia, and Wyoming. For the remaining states for 1969 and 1970, reading participation data were unavailable, and sample size is the number of students tested as a percentage of Title I participants.

For 1974, reading participation data were unavailable for Connecticut, Idaho, Maryland, Utah, and Massachusetts; for these states, sample size is the number of students tested as a percentage of Title I participants. For Iowa, sample size is the number of students tested as a percentage of Title I reading and math participants.

^aTest interval is the number of months between pretest and posttest.

^bTest interval varies. Grades 1, 8, and 11: eight months; grade 9: seven months.

^cInadequate data on test interval and the time of year the children entered the program.

^dExcluded from analysis because achievement data were not available or could not be converted to average monthly gains.

^eData excluded from analysis because of small sample size.

^fTest interval varies. Grade 1: seven months; grades 3, 4, 5, and 9: nine months; grades 7 and 8: twelve months.

^gTest interval varies. Grade 1: seven months; grades 2 and 7: nine months; grades 3-6 and 8-12: eight months.

- ^h Ranges of gain were reported by grade in Hawaii, 1974 (<0-7 mo, 7 mo-1.5 yr, >1.6 yr), but the categories of range were too broad to be included in the national grade-by-grade sample. A statewide mean was computed for use in the extended sample.
- ⁱ Test interval varies. Grades 3 and 4: 12 months; grade 5: 9 months; grade 6: 10 months; grade 7: 0.1 month.
- ^j Test interval varies among 5, 7, and 12 months.
- ^k Excluded from analysis because achievement data were not available or could not be converted to average monthly gains.
- ^l Test interval varies. Grades 2, 3, 5, and 6: 11 months; grade 4: 10 months; grade 7: 9 months; grade 8: 8 months.
- ^m Test interval varies. Grades 4, 7, and 8: 12 months; grades 5 and 6: 9 months.
- ⁿ Test interval varies from 7.0 to 8.5, centering around 8.0.
- ^o Test interval varies. Grades 1 and 10: seven months; grades 2, 3, 4, 5, 6, 7, 8, 9, 11, 12: eight months.
- ^p The SEA recommended spring-to-spring testing beginning 1970-71, but report states "no uniformity of pre- and post-testing."
- ^q Test interval varies. Grades 1 and 6: nine months; grades 2, 3, 4, and 5: seven months; grades 7 and 8: eight months; grade 9: ten months.
- ^r Test interval varies. For 1970-71, grade 1: 5.4 months; grade 2: 7.0 months; grade 3: 6.4 months; grade 4: 7.3 months; grade 5: 8.5 months; and grade 6: 7.9 months.
- ^s Test interval varies. For 1971-72, grade 1: 5.9 months; grades 2 and 3: 6.8 months; grade 4: 6.5 months; grade 5: 6.2 months; grade 6: 6.7 months; grade 7: 7.7 months; and grade 8: 7.1 months.
- ^t Test interval varies. For 1972-73, grade 1: 7 months; grade 2: 8.3 months; grade 3: 8 months; grade 4: 4 months; grade 5: 10 months; grades 6 and 7: 7.3 months; and grade 8: 4.4 months.
- ^u Test interval varies. For 1973-74, grades 1, 2, 3, 7: six months; grades 4, 8: eight months; grades 5, 6: seven months.
- ^v Test interval varies. Grades 2, 3, 4, 5: eight months; grade 6: seven months.
- ^w SRS = stratified random sample.
- ^x Test interval varies from 5 to 12 months.
- ^y Test interval varies. Grades 2, 3, and 6: 8 months; grades 4 and 5: 9 months; grades 7 and 8: 10 months; grade 9: 11 months.
- ^z Test interval varies. Grade 1: six months; grade 2: seven months; grades 3, 4, and 5: eight months; grades 6 and 8: nine months; grade 7: ten months.
- ^{aa} Test interval varies. Grades 2-9: eight months, grade 10: nine months.
- ^{bb} Test interval varies. Grades 1, 10: seven months; grades 4-9: eight months; grade 12: four months.
- ^{cc} Test interval varies. Grade 1: ten months; grades 2 and 10: six months; grades 3, 6, 7, and 8: seven months; grades 4 and 5: eight months; grade 9: four months.
- ^{dd} Test interval varies. Grade 4: eight months; grades 7, 10, and 11: seven months.
- ^{ee} The policy in Tennessee is to return the child to the regular classroom from the Title I class as soon as his reading skills allow it, so a majority of the students do not spend a full year in Title I. We did not include the achievement data since pretesting and posttesting are usually not done on the same group of children.
- ^{ff} Excluded from analysis because achievement data were not available or could not be converted to average monthly gains.
- ^{gg} Test interval varies. Grade 1: 12 months; grades 2, 11, and 12: 8 months; grade 3: 10 months; grades 4-10: 9 months.

state report, we used 0.35 as the midpoint (mean) of the range of scores below 0.7 and 1.75 as the midpoint (mean) of the range above 1.5. We then multiplied the estimated mean of a range by the percentage or number of students in that range and calculated an average of these weighted means. This average became the statewide mean at each grade level that we used for each state. Several states reported, for a grade, both the mean and the number or percentage of students in each range. For these states we were able to verify our procedure by calculating a statewide mean from the ranges and comparing this mean with the reported statewide mean. The comparisons showed little or no difference between the mean reported by the states and the means calculated from the ranges.

Sample Weightings

The analyses in this report are based on the sample means taken from individual SEA Title I evaluation reports. These sample means could be regarded as obtained from either a national school population or a population consisting of 50 state school populations. In this report we have treated the state sample means as if they had been obtained from a stratified sample, where each state represented a unique stratum. Our rationale for this decision was based on the results of the Friedman analysis of variance of ranks for states, which showed statistically significant differences among states.

The differences between regarding a sample as obtained from a single population and from different strata of a population are as follows: When more than one sample is drawn, without replacements, from an unstratified population, the population mean is estimated by taking a weighted average of the sample means, basing the weighting on the sample sizes. If we regard the means in the SEA Title I reports as means of repeated samples, without replacement, taken from a single population,

then these means should be weighted according to their sample size. If samples are drawn from different strata of a stratified population, the population mean is estimated by taking a weighted average of the sample means but basing the weighting on the strata sizes. If we regard the means in the SEA Title I reports as means of a stratified population, then these means should be weighted on the basis of the state populations.

The results of the two possible weightings of the Initial Sample's average monthly gains for 1970-71 through 1973-74 are shown in Table A-4. For 27 of the 48 comparisons, the results are identical; for 20 of the comparisons, the results differ by only 0.1. For only two of the comparisons do the results of the weighting differ by more than 0.1, and each of these cases is in the high-school grades where sample means are based on a very small number of states.

Table A-4

COMPARISON OF WEIGHTINGS OF INITIAL SAMPLE STATES'
AVERAGE MONTHLY GAINS

Year	Grade											
	1	2	3	4	5	6	7	8	9	10	11	12
1970-71												
Weight x sample	1.0	1.0	1.0	1.0	1.0	1.0	1.3	1.1	1.4	1.3	1.4	1.8
Weight x state population	1.0	1.0	1.0	1.1	0.9	1.0	1.2	0.9	1.3	1.3	1.4	1.8
1971-72												
Weight x sample	1.0	1.0	1.1	1.1	1.1	1.1	1.2	1.2	1.4	1.4	1.5	1.6
Weight x state population	1.0	1.0	1.1	1.1	1.0	1.1	1.2	1.2	1.3	1.4	1.4	1.5
1972-73												
Weight x sample	1.0	1.1	1.1	1.0	1.1	1.1	1.1	1.2	1.3	1.2	1.3	1.2
Weight x state population	1.1	1.1	1.1	1.0	1.1	1.1	1.2	1.2	1.4	1.4	1.2	1.2
1973-74												
Weight x sample	1.0	1.0	1.0	1.1	1.1	1.1	1.1	1.2	1.3	1.1	1.2	1.3
Weight x state population	1.0	1.1	1.1	1.0	1.1	1.1	1.2	1.1	1.2	1.1	1.2	1.2

Appendix B

ACHIEVEMENT PATTERN OF THE DISADVANTAGED STUDENT DURING SUMMER RECESS

This appendix summarizes the literature relating to the achievement pattern of the disadvantaged student during the summer recess.

The first article consulted, "A Procedural Guide for Validating Achievement Gains in Educational Projects" (Tallmadge and Horst, 1974)^{*} did not include original data; the authors cited an article by Beggs and Hieronymus (1968), based on Beggs' Ph.D. dissertation, on achievement during the summer, which was written under the supervision of Hieronymus at the University of Iowa. Although some students in Beggs' study did show a substantial loss of achievement during the summer in some subjects, such as mathematics, Beggs found only a slight loss in reading in any grade.

Hieronymus is one of the senior staff who have supervised the standardization of the Iowa Test of Basic Skills. In a personal communication he stated that he had found little evidence of a large summer drop-off in reading. He went on to say that, although loss had been found in certain subjects and grades, summer loss was quite a complicated issue and generalizations about it could not be made. He stated that test norms were quite accurate during the October-April or -May period (the period most commonly associated with the pretesting-to-posttesting interval).

^{*} References are listed at the end of this appendix.

Patterns of summer retention by subject were discussed in "Exposure and the Effects of Schooling" (Heyns, 1975). Heyns stated that "The majority of studies find that reading, vocabulary and language show insignificant change during the summer, while arithmetic, problem solving and spelling generally show loss." To support this statement, Heyns cited various sources (Patterson, 1925; Irmina, 1928; Schrepal and Laslett, 1936; Keyes and Lawson, 1937; Bender, 1945; North, 1955; Parsley and Posell, 1962; Beggs and Hieronymus, 1968; Soar and Soar, 1969). Heyns also discussed her own study of the summer vacation period, which showed that the average student did not suffer an actual loss in reading achievement during the summer; however, if a student was black, or his SES status was low, or both, there was a high probability of some reading-achievement loss (one to two months) during the summer. The same students who showed reading-achievement loss during the summer achieved during the October-May period far less than the month-for-month gain expected for the median student.

A study of reading achievement during the summer was recently conducted (Thomas, 1975) in a San Jose school district having a large number of both bilingual and low-SES students. The results of the study showed little or no reading-achievement loss during the summer, even though the rate of gain was substantially less than the rate during the school year. There was little absolute loss of reading achievement in any of the grades studied, grades 2 through 7. (The average N per grade was approximately 167; the total N was approximately 1,006.)

A large-scale study was done in New York during the mid-1960s (Hayes and Grether, 1969). The results of this study have recently been reanalyzed in "The Development of Reading Achievement Differentials During the School Year" (Hayes and King, 1974). Hayes and King investigated not only reading achievement during the summer but also the interaction of reading achievement and SES. Unfortunately, this study used

school means (N = 603) rather than student means (although the study did include over 380,000 students). The results of the study showed the same reading-achievement pattern found in all other studies, that is, lower SES students gained very little over the summer; they lost as much as one to two months during the three-month summer vacation. All other children continued to make modest gains, especially after they had begun fourth grade.

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Appendix C

TEST PUBLISHER NORM PATTERNS

The grade-equivalent (GE) growth of the 20th-percentile (or any other percentile) student can be estimated by using test publisher norm tables. In this appendix we examine the achievement of the 20th-percentile student to see the extent to which test publisher norms reflect the higher rate of achievement during the school year and summer recess fall-off discussed in Chapter III.

Most test publishers equate both percentile measures and GEs to the raw scores on tests. For each test there are tables enabling the raw score of the 20th-percentile student at the beginning of the year and the end of the year to be converted into GEs. The GE growth of the 20th-percentile student is the difference between the end-of-year score and the beginning-of-year score. To calculate the average monthly gain, the GE growth is divided by the time from the beginning-of-year norm point to the end-of-year norm point.

Several caveats are in order for the analysis that follows. First, the GE scale was developed for the 50th-percentile student. Therefore it is the percentile/raw score scale alone that must reflect the variations in the pattern of school year and summer achievement rates as a function of academic ability. The percentile/raw score measures are given for a band of months in the norming charts but are strictly accurate for only one point in time: the point when one month earlier the 20th-percentile student would have had a lower raw score and one month later would have a higher raw score. The importance of these variations is greatly magnified by the GE scale. Although we were careful in these

calculations, the information available from test publishers was not always sufficient for determining the precise test interval. The interval given by test publishers is generally somewhere between six and seven months; the difference between six and seven months is quite significant in the average monthly gain calculations.

Table C-1 presents the calculations from the norming tables for a variety of tests. The following information is given for 20th-percentile students in grades 2 through 6: the GE levels at the beginning and at the end of the year; the GE gains between the beginning and the end of the year and between the end of the year and the beginning of the next year;^{*} and the average monthly gain during the school year.

The first tests examined were the Metropolitan Achievement Test (MAT) and the Gates-MacGinitie. We examined these tests first because they were the only achievement tests used up to 1973-74 that were normed using a sample in the fall (October) and spring (April). The other tests were normed by only one norming sample (usually in January or February). Consequently, if any test norms could be expected to reflect the short-term achievement rates of disadvantaged students during the school year, it would be the MAT or Gates test norms.

The MAT results show that the average monthly gain for the 20th-percentile student varies greatly from grade to grade. The third grade average monthly gain is particularly poor, only 0.25 month per month. By contrast, the fifth grade shows an average monthly gain of 1.17 months per month.[†] The average monthly gains for grades 2, 4, and 6

* The gain between the end of one year and the beginning of the next is not solely the gain over the summer recess. It includes portions of the school year outside the test period (e.g., September, June, and parts of May, depending on the test).

† The calculations are carried out to hundredths, not because we believe the norms are that accurate, but because we did not want to introduce rounding error.

Table F-4

READING-ACHIEVEMENT GROWTH OF THE 20TH-PERCENTILE STUDENTS
PREDICTED BY TEST PUBLISHER NORMS

Test	Grade 2		Grade 3		Grade 4		Grade 5		Grade 6	
	Beginning of School Year	End of School Year	Beginning of School Year	End of School Year	Beginning of School Year	End of School Year	Beginning of School Year	End of School Year	Beginning of School Year	End of School Year
20th grade-equivalent level										
NAT (total reading)	1.6	2.1	2.35	2.5	2.8	3.2	3.6	4.3	4.4	4.9
CAT (total reading)	1.1	1.85	2.1	2.5	2.7	3.1	3.6	4.0	4.15	4.6
Gates-MacMillan (vocabulary)	1.45	1.95	2.15	2.75	3.15	3.7	3.85	4.2	4.65	5.15
ITBS (vocabulary)	1.65	2.25	1.95	2.65	2.85	3.6	3.8	4.2	4.35	4.85
ITBS (reading)			2.1	2.6	2.9	3.45	3.75	4.25	4.6	5.15
SAT (1973 version)	1.6	2.1	2.15	2.65	2.9	3.65	3.8	4.6	4.8	5.3
20th absolute gains										
NAT (total reading)	0.5		0.15	0.15	0.3	0.4	0.4	0.7	0.1	0.5
CAT (total reading)	0.75		0.25	0.4	0.2	0.4	0.3	0.6	0.15	0.35
Gates-MacMillan (vocabulary)	0.5		0.2	0.6	0.4	0.55	0.15	0.45	0.45	0.5
ITBS (vocabulary)	0.8		0.3	0.7	0.2	0.55	0.4	0.15	0.35	0.55
ITBS (reading)			0.5	0.5	0.3	0.55	0.3	0.55	0.4	0.5
SAT (1973 version)	0.7		0.05	0.5	0.25	0.55	0.35	0.6	0.4	0.7
20th average monthly gains										
NAT (total reading)	0.83		0.25	0.25	0.3	0.67	0.4	1.17	0.83	0.83
CAT (total reading)	1.07		0.57	0.57	0.57	0.57	0.3	0.86	0.50	0.50
Gates-MacMillan (vocabulary + 0.7)	0.71		0.86	0.86	0.77	0.77	0.15	0.57	0.71	0.71
ITBS (vocabulary + 0.7)	1.14		1.0	1.0	0.77	0.77	0.85	0.77	0.85	0.85
ITBS (reading + 0.65)			0.77	0.77	0.85	0.85	0.92	0.92	0.77	0.77
SAT (1973 version + 0.8)	0.88		0.81	0.81	0.75	0.75	0.81	0.81	0.77	0.89

Note: Beginning of school year is taken to be October; end of school year is taken to be April or May.

range from 0.67 to 0.83 and are more consistent with our expectations. If we average the monthly gains for grades 2 through 6, we get an average monthly gain of 0.75, which is only slightly below our figure of 0.78-month gain made by the disadvantaged student during the school year. If the third grade is deleted, the average of grades 2 through 6 is 0.88, or the upper end of the average monthly gain we calculated on the basis of one month of summer loss.

The MAT calculations highlight two facts. First, both the GE and the average monthly gains for the 20th-percentile student vary considerably across grade levels. Second, the short-term within-year gains are higher than 0.7 and more consistent with a student staying even over the summer than losing a month.

The California Achievement Test (CAT), the Gates-MacGinitie Reading Test, and the Iowa Test of Basic Skills (ITBS) show roughly equivalent results. The range of average monthly gains is somewhat less, but this is primarily attributable to the third-grade anomaly in the MAT discussed above and the fact that with only one norming point the CAT and ITBS smooth their data over the year. The five-year averages of average monthly gains for the CAT and Gates-MacGinitie Reading and the four-year average of average monthly gains for the ITBS are shown below:

CAT	0.71
Gates-MacGinitie	0.84
ITBS	0.83.

Two of these averages are significantly above the 0.7 average monthly gain and are about halfway between the projected values based on no summer drop-off and a one-month summer drop-off.

The last test we examined was the new Stanford Achievement Test (SAT). This test was not used in the Title I reports because it became generally available only in the 1974-75 school year. However, it has

two norming samples, as does the MAT, and its norming procedures are considered by many to be the most sophisticated. The average over the five grade levels of the SAT's average monthly gain is 0.83. In addition, the SAT shows less grade-to-grade variability than the other tests.

The evidence from the norming tables of test publishers is that the 20th-percentile student does achieve at a faster rate than 0.7 during the school year.

Unfortunately, however, the information from the test publisher norms does not present as desirable a data base for estimating the 20th-percentile student's (non-Title I) achievement rate as might be hoped. Information in the technical manuals for the SAT indicates at least some slight tendency for the beginning-of-year norm to be too high and the end-of-year norm to be too low. Thus an actual 20th-percentile student given these standardized tests on a pretest and posttest basis would be expected to score slightly higher than the difference between the two GE scores given in the test publisher norms. For example, on the SAT, which averages a 20th-percentile growth of 0.83 month per month across grades 2 through 6, an actual 20th-percentile student would score somewhat higher, probably between 0.85 and 0.90.

The conclusion from our study of test publisher norms is that the broad pattern of school and summer reading achievement reflects the pattern that we developed on the basis of our investigation of research on the summer drop-off pattern. In addition, it suggests that, to the extent that pretest-posttest evaluations continue to be relied on (rather than the longitudinal evaluations we strongly recommend), further study should be given to the accuracy of the test publisher norms for low-achieving students.

Appendix D

LONG-TERM EFFECTS OF ESEA TITLE I

Introduction

Depending on the state and the school district, the median disadvantaged student will have participated in between two and four years of Title I projects by the end of sixth grade. The issue we want to examine here is how the impact of Title I is affected by intervening periods, that is, the summer recess, and by subsequent school years without Title I. We present below three general hypotheses concerning the reading achievement of disadvantaged students during periods of "nonparticipation." Each hypothesis rests on assumptions based on our finding in Chapter II: Short-term, pretest-to-posttest effects* of Title I participation result in an increase in reading achievement of two or more months above the expected achievement for a disadvantaged child; these effects are found for each year of participation.[†] The three hypotheses are not intended to be exhaustive but rather to present a reasonable expectation for Title I and two extremes.

The first hypothesis, which we term neutral, is that a Title I student maintains in subsequent years the increment in reading achievement gained during each period of participation in the Title I project. When

* We use the term effects to specify the student's incremental reading achievement gain as a result of participation in a Title I project, that is, the incremental gain above the expected gain without Title I participation.

[†]See Chapter III.

not in a Title I project, the student returns to his previous rate of achievement during the school year. The normal summer drop-off for a disadvantaged student is not affected by school year participation, either positively or negatively. For example, if the yearly gain were nine months while in Title I and seven months while not in Title I, the student with three years of participation in Title I during elementary school would be expected, at the end of sixth grade, to score six months higher on a GE scale than a similar disadvantaged student who had not participated in Title I.

The second hypothesis, which we term optimistic, is that some part of the increase in reading achievement rate gained during Title I carries over into the regular classroom in subsequent years.* Thus, using the same numbers as in the previous example, the gain in the regular classroom after a period of time in Title I might be eight months per year rather than the previous seven months. With three years of participation, the total incremental gain at the end of the sixth grade would then be more than six months. It could be as much as nine months if most of the participation was in the early grades and thus the student had an eight-months-per-year gain in the later grades.

The third hypothesis, which we term pessimistic, is that the student not only falls back to his previous long-term rate of progress on returning to the regular classroom but also loses the gains achieved during a Title I project. This could occur either through decreased achievement during the school year or increased achievement drop-off during the summer. This assumption may appear to be unduly pessimistic, but this pattern is a common one, at least for early childhood programs.

* We might also have assumed, but did not, that summer drop-off decreases.

Procedure

The major problem in examining these hypotheses is the acquisition of data that can be used to test them. The best data source would be longitudinal records of individual students, describing their Title I participation and nonparticipation, with enough test points to describe their growth within and between years. The Educational Policy Research Center (EPRC) at SRI is currently trying to construct such data on a retrospective basis, and in the future the USOE/Systems Development Corporation's study of the sustaining effects of compensatory education will provide such information on a representative national sample.*

The data available are the aggregate results of certain state testing programs that report scores by some years and grade levels for the entire state. Our procedure here is to estimate the long-term effects of Title I in a state from the Chapter II data (the SEA Title I evaluation reports) under varying assumptions; to calculate the effects we would expect to see reflected in the state testing data; and, finally, to inspect the state testing data for these effects.

Our strategy is to focus on testing the neutral hypothesis. If this hypothesis is correct, then, for states with Title I programs reporting average monthly pretest-to-posttest gains much greater than the expected 0.8 to 0.9, over several years, we should be able to detect an upward shift in the state test results for low-percentile students. For example, we would expect the 25th-percentile score for a given state to increase and, it would be hoped, to exceed the expected (nationally normed) score for that percentile. We would expect this shift to be

* The EPRC report should be available in June 1976 but will not be nationally representative. The USOE/SDC study will begin to collect data in September 1976; it will be 1980 before three years of data are analyzed and become publicly available.

larger the higher the grade level, because the later grades would be expected to reflect more years of Title I participation for the average educationally disadvantaged student. We would also expect this shift to be more visible for states in which a large percentage of eligible students participate in Title I reading projects.

We assume that, if the demonstrated effects were larger than expected for the neutral hypothesis, the optimistic hypothesis would be supported; if they were smaller, the pessimistic hypothesis would be supported.

In the remainder of this chapter, we first describe our procedures for estimating overall effects, which consist of estimating (1) the size of the pool of eligible participants, (2) the percentage of students in Title I each year, and (3) the expected effects for groups with different amounts of Title I participation. We then describe our calculations for the effects we would expect to see in the state testing data and present a table summarizing these expected effects. Finally, we compare data from each of three states (California, Michigan, and New York) with the previously calculated estimates.

Size of Eligible Pool

We assume that the typical state selects low-achieving, low-income students for participation in Title I, in such a way that nearly all Title I participants would be expected to score below the 30th percentile on national norms in the absence of Title I or other compensatory education services. Since most states have student populations that, in the aggregate, deviate from national norms by only a few percent, we also assume that approximately 30% of the students in a state would qualify for Title I on the basis of educational disadvantage. Not all students who would qualify on educational grounds are in districts receiving Title I

funds, or, if in those districts, they are not in the attendance areas of the Title I funded schools (since Title I funds are targeted on low-income districts and are concentrated on services to heavily disadvantaged schools). Work done by the EPRC on test-score distribution suggests that, if 30% of the students in a state could qualify on educational grounds, less than 20% would ever be in a school receiving Title I funds. Thus a reasonable estimate of the maximum size of the pool of Title I participants would be 20% of the total elementary school student population in a state.*

Percentage of Title I Participants

The data from the three states show different patterns of Title I participation. The participation percentages range from 7% to 12% of total state enrollment in each elementary grade. We performed calculations using both the 7% and 12% participation rates to estimate the Title I effects.

Estimation Procedure

We first calculate here the estimated long-term effects for two extreme situations, maximum concentration and minimum concentration, to display our approach. For maximum concentration we assume that the same students participate each year in Title I. Therefore the effect each year would be the yearly incremental gain times the number of years in the program. With an incremental gain of two months per year, by the end of third grade the sum of the incremental gains for an average

* This analysis does not include high schools, because, relative to elementary schools, so few funds are allocated to high schools that the effects we are attempting to observe (with the data we have available) would not be visible.

student participating in the program every year (i.e., maximum concentration) would be 12 months.

To calculate the effect of minimum concentration, we spread Title I participation as thinly as possible across the pool of eligible participants. For example, assume a two-month gain per year, with 7% of the population participating (out of an eligible 20%). We calculate the expected effect by multiplying the incremental gain (two months) by the percent participating (7%) by the number of years (three years in third grade) and divide this product (0.42) by the maximum percentage of students who might ever be in Title I (20%). This example gives a series of incremental gains that sum to 0.21 for the average Title I participant who has only 1.05 years in the program by the third grade (in comparison with an expected effect of 0.60 under the maximum-concentration assumption).

Expected Change Reflected in State Testing Data

We are interested in how these expected effects would be reflected in the state testing data. To calculate this, we average the estimated effect across the bottom 30% of the distribution (the population at which Title I is aimed). Following our previous example, we now divide the product (0.42) by 30%. This gives us an average increment of 0.14 month, which becomes the shift we expect to see for any percentile below the 30th. For convenience, and because the state data are in this form, we arbitrarily pick the 25th percentile as our focus.

In Table D-1 we present our estimates. The columns show the shift we would expect to observe in the bottom 30% of the state distribution of scores. The upper half of the table is based on an average Title I project effect of two months per year and the lower half on an average Title I project effect of three months per year. If we average a

Table D-1

ESTIMATED STATE TESTING DISTRIBUTION SHIFT
FOR THE 25th PERCENTILE STUDENT

<u>Grade</u>	<u>7% Participation</u>	<u>12% Participation</u>
	<u>per Year</u>	<u>per Year</u>
	<u>Average Incremental Gain of Two Months</u>	
1	0.05	0.08
2	0.09	0.16
3	0.14	0.24
4	0.19	0.32
5	0.23	0.40
6	0.28	0.48
	<u>Average Incremental Gain of Three Months</u>	
1	0.07	0.12
2	0.14	0.21
3	0.21	0.36
4	0.28	0.48
5	0.33	0.60
6	0.42	0.72

two-month gain over 30% of the student population, then, at the end of fourth grade, we would expect to see an increase of 0.32 in the score for the 25th-percentile student in a state testing distribution. These effects would obviously be small for the early grades because of the percentage of students participating and the lack of opportunity for aggregation. By the fourth grade, however, these effects should be quite noticeable. Hence our comparisons with the state testing data focus on the later elementary grades.

State Testing Data

California

Expected Results

Conditions in California can best be approximated by using the calculated values from Table D-1 for 12% participation and an average two-month gain.* Thus under the neutral hypothesis, the following GE increments would be expected at the 25th percentile by 1973-74 (rounded to tenths of years):

Grade 1	0.1	Grade 4	0.3
Grade 2	0.2	Grade 5	0.4
Grade 3	0.2	Grade 6	0.5

In 1971-72 about 12% of the total student population in grades 1, 2, and 3 in California participated in Title I reading projects. The comparable figure for grades 4, 5, and 6 is about 10%. In earlier years, more students received Title I services, but the concentration on reading projects was less. Thus it appears that the 12% and 10% are good approximations of the Title I reading project participation over the full five years.

The results of Title I projects in California from 1969-70 to 1973-74 are shown in Table D-2. Of the 30 cells, 11 are at the 1.0 level, 14 at the 1.1 level, 2 below 1.0, and 3 above 1.1. Existing data on California's Title I projects prior to 1969-70 show gains generally greater than those in later years. However, the sample sizes are small and not random (only certain cities provided test results).

* This gain is based on the assumption that the rate of gain during the pretest-to-posttest interval is constant during the remainder of the school year.

Table D-2

CALIFORNIA TITLE I MEAN PROJECT GAINS PER MONTH
DURING PRETEST-POSTTEST INTERVAL

Year	Grade					
	1	2	3	4	5	6
1969-70	0.9	0.8	1.0	1.1	1.1	1.2
1970-71	1.0	1.1	1.0	1.1	1.0	1.0
1971-72	1.0	1.1	1.3	1.1	1.1	1.1
1972-73	1.0	1.1	1.1	1.1	1.0	1.1
1973-74	1.1	1.0	1.0	1.3	1.0	1.1

An average monthly gain of 1.05 equals 9.5 months over the school year. In light of the discussion of the over-the-summer learning curve for disadvantaged students in Chapter III, this corresponds to an incremental gain of between 1.5 and 2.5 months approximated by the two-month calculations in Table D-1.

Achieved Results

The results for the California state testing program are shown in Table D-3. Beginning in 1965-66, testing was done at the end of grades 1 and 2. Testing was begun at the end of grade 3 in 1966-67 and at the beginning of grade 6 in 1969-70. This is the best set of testing data that we could find for any state. It has some problems, however, the chief problem being the change in the primary grades from the reading part of the Stanford Achievement Test (SAT) to the Cooperative Primary Reading Test (COOP).

The change is shown in Table D-3 by the heavy black line between 1968-69 and 1969-70 for the first grade, one year later for the second grade, and two years later for the third grade. The norming samples on the SAT did not adequately represent the performance of urban

Table D-3
READING ACHIEVEMENT TEST SCORES IN GRADE EQUIVALENTS
FOR CALIFORNIA

Grade	Percentile	1965-66	1966-67	1967-68	1968-69	1969-70	1970-71	1971-72	1972-73	1973-74
1	25	1.4	1.5	1.5	1.5	1.5	1.5	1.6	1.6	*
	50	1.6	1.6	1.6	1.7	1.8	1.8	1.8	1.8	*
	75	1.8	1.9	1.9	2.0	2.2	2.2	2.3	2.4	*
2	25	1.9	1.9	1.9	1.9	2.0	2.1	2.2	2.2	2.2
	50	2.5	2.5	2.5	2.6	2.6	2.8	2.9	2.9	2.9
	75	3.0	3.1	3.1	3.2	3.2	3.5	3.6	3.7	3.7
3	25	--	2.7	2.7	2.7	2.8	2.8	2.9	3.0	2.9
	50	--	3.4	3.4	3.4	3.4	3.5	3.8	3.8	3.8
	75	--	4.1	4.1	4.2	4.2	4.2	4.3	4.3	4.3
Comprehensive Test of Basic Skills										
6	25	--	--	--	--	4.5	4.4	4.3	4.3	4.3
	50	--	--	--	--	6.0	5.8	5.7	5.7	5.7
	75	--	--	--	--	7.6	7.4	7.4	7.4	7.4

* Not available.

populations, and hence any comparison between achievement on the SAT and achievement on the COOP is, strictly speaking, improper. This problem does not exist for the sixth grade, where only the Comprehensive Test of Basic Skills (CTBS) was used, but for the sixth-grade level only five years of data are available.

Examining the scores for grades 1, 2, and 3, one immediately sees that the GE scores for the 25th percentile have a slight upward trend, which is encouraging. The sole exception is for the third grade on the COOP for 1971-72 through 1973-74. If we use the 1965-66 and 1966-67 scores for the 25th-percentile student as an estimate of the pre-Title I rate of performance, the following results emerge.

In grade 1, there has been an increase in the score of the 25th-percentile student by 0.1 GEs (somewhat larger if one uses the 1.4 in 1965-66 as the base).

In grade 2, there has been an increase of either 0.2 or 0.3 GEs from before Title I, depending on whether or not one takes into account the 0.1 increase across the change of tests between 1969-70 and 1970-71. We prefer to be conservative and assume that the 0.1 GE gain is attributable to the change from the SAT to the COOP. Hence, the overall increase is 0.2 GEs.

In grade 3, the overall increase is only 0.1 (unless one allows another 0.1 across the change of tests).

Thus, for California, the results for grades 1 and 2 are consistent, at least at first glance, with the expected results of the neutral hypothesis. No accumulation of gains is possible in grade 1, and very little is expected by grade 2. By grade 3 the results are lower than expected, that is, a measured increment of 0.1 (or 0.2 at the most) compared with an expected increment of 0.3.

Moreover, it is not obvious that even the limited upward trend, that is, the increment in test scores for the 25th-percentile students in grades 1, 2, and 3, can be attributed to the effect of Title I. Both the 50th- and the 75th-percentile students exhibit the same or greater upward movement in test scores from 1965-66 to 1973-74, and it is extremely unlikely that Title I was the cause. It is more likely that some outside factors generally affected reading scores in California across the 25th, 50th, and 75th percentiles.

The evidence becomes quite clear when we examine the test scores for the beginning of the sixth grade. Because data were not collected prior to 1969-70, no estimate of pre-Title I achievement gains exists. However, since the achievement levels declined for all percentile levels in 1969-70 and 1970-71 and remained flat thereafter, the 1965-66 level of achievement is less of an issue. Under the neutral hypothesis, a downward movement or even constancy in 25th-percentile scores is inconsistent with the high project gains and high participation level reported in the first five grades as the students from earlier Title I projects begin to reach the sixth grade (a student in a first grade Title I project in 1966-67 would have entered the sixth grade in 1971-72).

Data from the California state testing program would lead one to reject the neutral (and optimistic) hypothesis and accept the pessimistic hypothesis on the sustaining effects of Title I. The data are hardly of the quality one would want to make fine distinctions between the alternative hypotheses, but fine distinctions are not required. In a most obvious manner, the California data show that the high level of Title I project gains (greater than month for month during the school year or nine months during the calendar year) is not being sustained by Title I-eligible students as they progress through the grades.

Michigan

In Michigan the state assessment program began in 1970-71. Therefore, we cannot reference Title I gains to an initial state distribution in 1965-66, when Title I began. Instead, we must use as our base point the distribution in 1970-71. This limits the maximum sustaining effect that we can inspect to three years, 1971-72 through 1973-74.

Expected Results

Conditions in Michigan can best be approximated by using the calculated values from Table D-1 for the 7% sample and an average gain of three months.*

By 1973-74, we would calculate the expected increments in the scores of students in the 25th-percentile as follows (in tenths of years):

<u>Grade</u>	<u>Unrestricted Sustaining Effect</u>	<u>Sustaining Effects Limited to Three Years</u>
1	Less than 0.1	Less than 0.1
2	0.1	0.1
3	0.2	0.2
4	0.3	0.2
5	0.3	0.2
6	0.4	0.2
7	0.5	0.2

The percentage of participation in Michigan is approximately 7% in elementary school and less than 4% in high school. Since the state testing program occurs at elementary grades 4 and 7, 7% is the appropriate participation percentage.

* The gain was calculated by using 1970-71 data as the baseline. The average gain of three months was based on the differences between the 1970-71 rate of achievement and the rates of all subsequent years.

The results of Title I projects in Michigan from 1970-71 to 1973-74 are shown in Table D-4. The Title I project rates of gain for grades 1 through 6 are 1.0 for 1970-71. Thereafter, the average gain per month is 1.3, a three-month increment between 1970-71 and subsequent years.

Table D-4

MICHIGAN TITLE I MEAN PROJECT GAIN PER MONTH
DURING PRETEST-POSTTEST INTERVAL

Year	Grade						
	1	2	3	4	5	6	7
1970-71	1.0	1.0	1.0	1.0	1.0	1.0	na*
1971-72	1.4	1.2	1.3	1.3	1.3	1.4	1.5
1972-73	1.3	1.3	1.2	1.2	1.2	1.2	1.3
1973-74	1.3	1.3	1.2	1.2	1.3	1.3	na*

* Not available.

Achieved Results

Although each year there is some overlap in test questions in the Michigan state assessment program, students are administered a primarily new test. A test score is reported as a standard score with a mean of 50 and a standard deviation of 10. The standard scores are equated on the basis of a study that makes use of questions common between years to calculate the movement in the average score for the state, referenced to the base year. The mean or average scores for the fourth- and seventh-grade work relationship and reading tests are shown in Table D-5.

Table D-5

MICHIGAN'S AVERAGE SCORES EXPRESSED
IN 1971-EQUATED STANDARD UNITS

Grade	Test	Year			
		1970	1971	1972	1973
4	Word Relationship	50.0	50.6	49.0	48.6
4	Reading	50.0	50.5	50.4	49.9
7	Word Relationship	50.0	49.8	49.5	48.8
7	Reading	50.0	49.4	50.1	49.6

Source: T. H. Fischer, R. J. Huyser, and A. Wagner, "Tracing Educational Progress Through an Educational Assessment Program," paper presented at the National Council on Measurement in Education Convention, 1974.

A 0.2-year sustained project effect in grades 4 and 7 translates in standard deviation units to an increase of approximately 3.2 units in the fourth grade and 4.2 units in the seventh grade.* However, this is the shift over the lower 30th percentile. Because it is the shift in the mean that is relevant here, we must spread this shift evenly over all percentiles and thus use only 30/100 of the calculated shift as applicable to the mean. This gives a shift of 1.0 unit in the fourth grade and 1.4 units in the seventh grade, or expected mean of 51.0 and 51.4, respectively. By contrast, Table D-5 shows that the scores for January 1973 are lower than those for January 1970; for both 1971 and 1972 two of the scores are higher and two are lower.

*One month on the GE scale near grade level translates to approximately 0.16 standard deviation at grade 4 and 0.21 standard deviation at grade 7, or 1.6 and 2.1 units when one standard deviation is set equal to 10.

The disparity between Michigan's educational assessment scores and the expected pattern (under the neutral hypothesis, with Michigan's Title I project gains and participation percentages) warrants the rejection of the neutral hypothesis (and the optimistic hypothesis) on the sustaining effects of Title I, although with less confidence than in the case of California, where the state testing data are more directly applicable to the analysis.

New York

In New York state, Title I project data are quite sparse, but considerable information is given on the state testing program.

Expected Results

Conditions in New York state appear to be best approximated by using the calculated values from Table D-1 for a 9% sample (interpolated) and a three-month increment. This gives expected results of:

Grade 1	0.1	Grade 4	0.3 to 0.4
Grade 2	0.2	Grade 5	0.4 to 0.5
Grade 3	0.3	Grade 6	0.5 to 0.6

However, the Title I project data are limited and could easily be subject to other interpretations.

The 1972-73 report is the only New York SEA Title I evaluation report available that one might characterize as unbiased. In 1971-72 that state tried to obtain complete reporting on a sample basis, but the SEA report states that the school districts did not adhere strictly to the proper sampling procedure and there appeared to be an upward bias in the results. In 1970-71, the first year for which we have a New York state SEA Title I evaluation report, the state reported gains only from exemplary projects.

The participation rate for grade 1 and for grades 7 and above is less than 5% of the total student population. For grade 2 it is approximately 11%, and it consistently falls with increasing grade level until at grade 6 it is only 6%.

The results for elementary schools in 1972-73 are shown in Table D-6. The pretests in the state evaluation report show an expected rate of growth of only 0.5 month per month in school for students in most elementary grades without participation in Title I. Thus the GE increment is more than three months per year, with the exception of grade 4; for grades 1, 5, and 6, the increment is of the order of five or six months, depending on assumed summer loss.

Table D-6

RESULTS OF 1972-73 NEW YORK STATE SEA TITLE I EVALUATION REPORT

<u>Grade</u>	<u>Gain per Month During Test Interval</u>
1	1.30
2	1.06
3	1.05
4	0.75
5	1.43
6	1.36

In the 1971-72 report the average rate of gain for those tested and reported on was 1.3 months for every month in the program in the elementary grades (1.7 in the secondary grades); on the basis of pretests, the estimated long-term rate of gain was 0.6 month per month. This sample was biased, however. When one examines the number of students tested and reported on, it appears unlikely that the average rate of gain for all Title I students was below 1.0. A 1.1 or 1.2 rate of monthly gain appears to be most likely. If these figures are compared

with the 0.6 month per month long-term rate of gain, a statewide GE increment in excess of three months as a result of participation in Title I is consistent with the data for 1971-72.

The data for 1970-71 are even less reliable. However, most of the exemplary projects reported were from neither New York City nor the large upstate cities. With New York City and the large upstate cities excluded, the report coverage appears to be about 50% for the areas for which separate performance data are available. For these areas a GE increment of greater than three months is indicated, at least partially on the basis of the low estimated long-term rate of gain without Title I.

Thus the coverage of the Title I project data for New York state is quite weak, with the exception of 1972-73. However, it still appears that an average yearly increment of three months or more for most of the early 1970s is highly probable. Furthermore, the participation percentages are moderate, near the 9% level. Thus we would expect to find a noticeable upward movement in statewide pupil scores at the low-percentile levels as a result of Title I participation.

Achieved Results

In New York state the Bureau of Pupil Testing and Advisory Services has conducted, since 1966, a state testing program on a sample basis to provide information on the educational progress in the schools in the state. Information is collected from both public and nonpublic schools, but the results reported here are for public schools only. Information is available for grades 3, 6, and 9.

The general pattern from 1965-66 to 1972-73 is one of approximately constant reading test results in the third grade, with an appreciable increase in the sixth grade in those scoring below the 23rd percentile and more than double the sixth grade increase in the ninth grade.

This compares to an expected decrease of approximately 6% and 8% of the total population in those scoring below the 23rd percentile in the third grade and sixth grade, respectively, on the basis of the expected grade equivalent increase of 0.3 in grade 3 and 0.5 to 0.6 in grade 6.

Table D-7 shows the percentage scoring below the 23rd percentile for each year (1965-66 was used as the standard for grades 3 and 6).^{*} The 1965-66 percentiles do not equal 23, because the standard was set on the basis of results from all state schools, both public and nonpublic, and our figures are for public schools only.

New York City shows the same pattern of results for the third grade as the overall sample: a 1% improvement. The sixth grade shows a somewhat larger decrease than the entire public school population shows. However, the other large cities, especially those known as the "big six," show even sharper rates of decline than New York City and even show appreciable declines at the third-grade level, that is, from 24% to 29% for the percentage below the 23rd percentile. For the smaller and rural upstate communities, the same general pattern of decline holds true, with minor variations.

The pattern of movement for the third and sixth grades is approximately the same as that for the median and the 23rd-percentile group (median not shown). Thus the same external forces appear to be affecting both groups. Disaggregating, the 23rd percentile moves in the same direction for all the subsamples. There is no difference in movement in New York City, and the 23rd percentile does slightly worse than the median in all the other five subsamples, except for one subsample at one grade level.

^{*} Grade 9 is not shown.

Table D-7

NEW YORK STATE TESTING DATA

Area	Grade	Percentage of Students Below 23rd Percentile									
		1965-66	1966-67	1967-68	1968-69	1969-70	1970-71	1971-72	1972-73		
Statewide public schools	3	26%	26%	25%	26%	27%	27%	25%	25%		
	6	26	27	26	28	30	30	30	30		
New York City	3	37	37	36	38	37	37	35	36		
	6	36	36	36	39	40	40	39	43		
Large cities (excluding New York City)	3	24	25	27	28	31	32	31	29		
	6	23	25	28	30	32	36	36	36		
Medium cities	3	18	20	18	18	21	22	20	20		
	6	19	19	20	22	24	24	25	28		
Small cities	3	17	17	16	17	18	18	17	17		
	6	17	18	18	20	22	22	22	23		
Villages and large central districts	3	13	13	13	13	14	13	13	12		
	6	13	14	14	16	17	17	18	18		
Large rural districts	3	15	15	15	15	15	16	16	16		
	6	16	17	17	19	19	20	21	20		
Small rural districts	3	17	16	15	16	16	18	17	18		
	6	18	18	19	19	20	22	22	21		

The overall conclusion for New York State is that there has been a decline in reading performance for the entire population since 1966 and that this decline is slightly worse for the poorest readers. The percentage of students falling below the 23rd percentile, on the basis of the 1966 state norms, either stays the same or tends to increase. Despite the large number of students in New York state participating in Title I projects and the high within-year gains compared with previous performance, no sustaining effect of Title I projects on pupil performance is evident. Thus the New York State testing data would lead us to reject the neutral (and optimistic) hypothesis and accept the pessimistic hypothesis. The paucity of Title I project data is a clear limitation to this conclusion, but the difference between the expected and achieved results is so large that we have moderate confidence in rejecting the neutral hypothesis.

Conclusion

Certain assumptions are typically made about the sustaining effects of Title I programs on a student's rate of performance in school. We developed three hypotheses on the effects of Title I participation.

- (1) The student maintains the gains achieved during a Title I project (neutral).
- (2) The student not only maintains the gains but also performs somewhat better when he returns to regular school (optimistic).
- (3) The student loses benefits accrued during a Title I project, either over the summer or when he has returned to regular school (pessimistic).

We used state testing data from three states to test which of the three hypotheses was most consistent with the results found in each state, given the state's record of Title I project gains and level of Title I project participation. The best data for comparing the three

patterns are from California; these data point strongly to the pessimistic hypothesis.

The data from Michigan and from New York have serious drawbacks. The Michigan state testing data show trends that are only for the mean; the New York data on Title I project gains are sketchy and biased, except those for 1972-73. Nevertheless, the data from both states are more consistent with the pessimistic hypothesis than with either of the more favorable hypotheses.

This analysis must be considered speculative. The methodology is based on a number of assumptions about participation patterns in Title I and the relationship of Title I students to the population of low-achieving students in a state. For example, it is theoretically possible that, in California and New York, where we looked at the score of the 25th- (and 23rd-) percentile student, dramatic improvement occurred in the scores of those below the 25th percentile without any change in the score of the 25th-percentile student. In fact, though, this did not occur, at least in California, because we were able to check the full distribution of test scores for several years. However, it is an example of other possible explanations that must be considered with such a gross analysis.

Similarly, some outside factors might account for the results. Nationwide test scores in reading appear to be declining, especially above the third grade. It is possible that this decline might be differentially stronger among low-achieving students. Thus the trend of the low-achieving students keeping pace with the median- and high-achieving students, as in California, might mask the fact that without Title I they would be doing even worse than this trend. However, for this particular example, independent data from test publishers' norming samples show no increase in the standard deviation of the test score distribution, which would

have to occur if the achievement of nationally low achievers were declining at a faster rate than that of average students.

Another consideration that occurred to us was that Title I students might not be proportionately represented in the state testing program results. It is not unheard of in some school districts for very low achievers not to be in school on the day that the state reading test is administered. Obviously, there are no exact figures on this phenomenon, but it is hard to believe that it could affect more than 1% of the total school enrollment, in which case it would not be a significant factor, especially if it occurred roughly in the same proportions each year.

Other possibilities include questioning the information on which this analysis was based, especially the reported state level of participation in Title I reading programs by grade level. Other possibilities probably occur to the reader.

Despite all these possible sources of error and confounding of the results, it is our belief that the data are strongly indicative that the high reported pretest-to-posttest gains in these three states are somehow being offset. The data are not sufficiently fine to allow us to estimate how much the gains are being diminished nor whether the diminishment that is occurring can be attributed to decreased average monthly gains during the school year in the months before and especially after the pretest-to-posttest period, an increase in the rate of summer drop-off, decreases below normal of the learning rate in school years subsequent to Title I participation, or a combination of all these factors and perhaps some not yet identified.

Answers to some of the fine-grained questions that the state testing data raise will require longitudinal evaluation data by student over a

number of years of both Title I participation and nonparticipation. Perhaps the strongest finding from our analysis of the state testing data is that these longitudinal issues are not merely of academic interest but rather are of major import to the conduct of ESEA Title I projects.